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BIOMEDICAL AND BEHAVIORAL SCIENCES
No. 67

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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS
BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 67

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BIOMEDICAL SCIENCES
Aerospace Medicine

USSR

UDC 612.53/59

PROBLEMATIC QUESTIONS OF INVESTIGATION OF THE THERMAL STATE OF MAN AWAY FROM EARTH

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY MEDITSINY I BIOLOGII" (Fifth Gagarin Lectures on "Problems of Aviation and Space Medicine and Biology." Collection) in Russian, Izd-vo DOSAAF 1976 pp 109-119

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R448 by Yu. A. Shulagin]

GLUSHKO, A. A.

[Text] The author notes that investigation of the thermal state of man in real space flight from the scientific point of view advances a number of new problems which are conventionally limited by the author to problems of the first, second and third kinds. Problems of the first kind include physiological and hygienic aspects of investigations--the development and testing of methods of diagnosis and prognostic evaluation of unfavorable thermal states and probabilistic diseases; study of the thermal state of man in the process of the effect of a complex of factors of cosmic space, and assuring the maximal working capacity of cosmonauts in open space. Problems of the second kind include a complex of physical and thermophysical investigations, in which the author includes the elaboration of the physical principles of methods of biocalorimetry, which permit measuring integral indicators of the thermal state of cosmonauts; comparative analysis of indirect indicators of the metabolism of cosmonauts, with direct calorimetric measurements; the development of methods of analysis of the topography of heat and moisture releases and thermotopography, and also methods of estimating the dynamics of heat-forming processes in the organism of man. The author includes in problems of the third kind technical questions connected with the development of a medical measurement complex. References 19.

USSR

UDC 612.014.482.5 613.693

INFLUENCE ON THE HUMAN BODY OF EXPERIMENTS SIMULATING SPACE FLIGHT
ACCORDING TO THE "SOYUZ-APOLLO" PROGRAM

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY
MEDITSINY I BIOLOGII [Fifth Gagarin Lectures on "Problems of Aviation and
Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF
1976 pp 49-56

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R566
by Yu. A. Shulagin]

PANFEROVA, N. YE., KUKOLEVSKAYA, YE. V. and ZHILIS, E. F.

[Text] Investigations showed that the staying of man in conditions simulating flight according to the "Soyuz-Apollo" program does not cause substantial changes in the state of health of man. However, under those conditions disruptions of the cardiac rhythm are possible, and also functional changes in adaptation to physical loads. At the same time, after a stay in conditions of model experiments a number of changes were noted in the state of the cardiovascular, central and muscular systems which were identical to changes after space flight. References 4.

USSR

UDC 612.014.482.5 613.693

EXPERIMENTAL INVESTIGATION OF THE CULTIVATION OF HYDROGEN BACTERIA FOR USE
IN LIFE-SUPPORT SYSTEMS OF SPACE VEHICLES

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY
MEDITSINY I BIOLOGII" [Fifth Gagarin Lectures on "Problems of Aviation and
Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF
1976 pp 287-305

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R587
by V. D. Bakharevich]

USHANOV, A. I., KOVALENKOVA, V. K., FOFANOV, V. I., SILETSKAYA, L. A.,
and ROMANOVA, E. A.

[Text] The prospectiveness of using hydrogen bacteria in life-support systems is pointed out, not only as a utilizer of CO₂ of the urine and hydrogen formed in the regenerator unit but also as a source of valuable protein suitable for consumption as food. It turned out that the creation of the UKM-1 installation for the cultivation of hydrogen bacteria, its biological and technological tests and subsequent work on it showed the possibility in principle of creating a reliable unit for the cultivation of

hydrogen bacteria. Stable working conditions of the installation are assured by observing the technical data and process parameters developed for it, which assure obtaining the daily quota of protein consumption per man (at least 300 g of dry biomass per day).

USSR

UDC 612.014.482.5 613.693

FINDING MEANS OF PRESERVING HIGH WORKING CAPACITY AND STABILITY OF MAN TOWARD THE EFFECT OF UNFAVORABLE FACTORS OF LONG SPACE FLIGHT

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY MEDITSINY I BIOLOGII" [Fifth Gagarin Lectures on "Problems of Aviation and Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF 1976 pp 189-193

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R567 by V. D. Bakharevich]

NEFEDOV, YU. G., BORSHCHENKO, V. V., SHUMILINA, G. A., ZHIDKOV, V. V. and ROGATOVSKAYA, A. P.

[Text] The use of previously-proposed thermal portable ventilated chambers was proposed for the restoration of forces after great physical and nervous stresses. Staying in such a chamber for 30 minutes at an air temperature of 50-65°C was characterized by a change of physiological functions not exceeding the allowable limits, which after 20 minutes returned to the original values with a completely satisfactory state of those tested. Staying in such a chamber at 75°C was accompanied by greater shifts in the state of physiological functions. The conditions of the chambers contributed to the preservation of a high functional level of the skin, with increase of its bactericidal activity.

USSR

UDC 612.014.482.5 613.693

FUNCTIONAL STATE OF THE KIDNEYS OF CREW MEMBERS OF THE "SOYUZ-12" SPACE VEHICLE BEFORE AND AFTER FLIGHT

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY MEDITSINY I BIOLOGII" [Fifth Gagarin Lectures on "Problems of Aviation and Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF 1976 pp 140-151

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R568 by Yu. A. Shulagin]

GRIGOR'YEV, A. I., KOZYREVSKAYA, G. I., DOROKHOVA, B. R., and NOSKOV, V. B.

[Text] The activity of the kidneys and systems of regulation of water and salt metabolism was studied both during different types of activity of cosmonauts and during the application of specific load tests (with excessive administration and limitation of water). In the first hours after completion of flight a considerable reduction of renal excretion of liquid, osmotically active substances and electrolytes was noted in both cosmonauts. On the day following landing the excretion of liquid and electrolytes by the kidneys of the cosmonauts was noted but it did not reach the pre-flight level. On the second day after landing the excretion of K practically reached the initial level, but that of Na, Ca, Mg and osmotically active substances remained reduced. The author assumes that such a retention of liquid and salts by the cosmonauts is an adequate reaction directed toward restoration of the water-ion equilibrium characteristic of conditions of terrestrial gravitation. References 13.

USSR

UDC 612.014.485.2 613.693

METHODOLOGICAL ASPECTS OF INVESTIGATIONS OF LIFE IN THE COSMOS

Moscow METODOLOGICHESKIYE ASPEKTY ISSLEDOVANIY ZHIZNI V KOSMOSE in Russian Izdatel'stvo Nauka 1976, 128 pp

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R581 K Resumé]

FESENKOVA, L. V.

[Text] The work is devoted to methodological analysis of investigations of the problem of extraterrestrial life. Examined in the book are the specifics of the object of those investigations, distinctive features of its formulation in science, and cognitive means used, including the structure of hypotheses. The author indicates the place of those problems within the system of scientific knowledge and its relation to the biological sciences and reveals the importance of dialectical materialism in the solution of those questions.

USSR

UDC 612.014.482.5 613.693

DIRECTION AND METHOD OF INVESTIGATIONS IN WORKING WITH SIMULATORS OF LIFE-SUPPORT SYSTEMS

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY MEDITSINY I BIOLOGII" [Fifth Gagarin Lectures on "Problems of Aviation and Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF 1976 pp 249-251

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R582 by V. D. Bakharevich]

RATNER, G. S.

[Text] It has been noted that the psychophysiological characteristics of a human operator in work with simulators of life-support systems consist in their realization of a game situation devoid of real risk. In addition, it does not seem possible for that category of persons to create the semblance of a real event with the presence of a sporting interest. It was proposed to consider the main criterion in evaluating an operator's work to be minimization of the man-hours necessary for control under conditions guaranteeing its reliability. A study was made of the amount and character of the information presented to a human operator during normal work and of determination of an optimal strategy in searching for defects during a malfunction, and also of determination of an effective method of repair operations and teaching it.

USSR

UDC 612.014.482.5 613.693

INFLUENCE OF THE COMBINED EFFECT OF STORAGE AND IRRADIATION ON THE PHYSICOCHEMICAL AND BIOLOGICAL PROPERTIES OF MELTED BUTTER

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY MEDITSINY I BIOLOGII" [Fifth Gagarin Lectures on "Problems of Aviation and Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF 1976 pp 310-317

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R583 by V. D. Bakharevich]

KASATKINA, A. G.

[Text] A study was made of the long storage (up to 2 years), and also storage with the effect of ionizing radiation (protons of 6 to 24,000 rads) on the physicochemical and biological properties of melted butter. The range of irradiation was selected by starting from the radiation situation of long flight. The obtained data established changes of a number of physicochemical

indicators of melted butter as a function of the storage time and radiation dose, but not exceeding the limits of the category characterizing the product. The biological value and properties of the product were judged by the degree of its assimilability. The results of the investigations showed that after 2.5 years of storage and irradiation during storage with protons in a dose of 24,000 rads melted butter can be considered suitable for consumption on the basis of its physicochemical and biological properties.

USSR

UDC 612.014.482.5 613.693

FUNCTION OF HUMAN EQUILIBRIUM IN CONDITIONS OF LONG STAY IN A ROTATING SYSTEM

Moscow PYATYYE GAGARINSKIYE CHTENIYA "PROBLEMY AVIATSIONNOY I KOSMICHESKOY MEDITSINY I BIOLOGII" [Fifth Gagarin Lectures on "Problems of Aviation and Space Medicine and Biology" Collection] in Russian, Izdatel'stvo DOSAAF 1976 pp 318-322

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R554 by V. D. Bakharevich]

GAVRILOVA, L. N.

[Text] Conducted investigations showed that there are two phases of change of function of equilibrium in the conditions of the stay of man in a rotating system. The first phase is observed in the period of development of a symptom complex of motion disease and is characterized by considerable disruption of the function of equilibrium. The second phase reflected the appearance of adaptive reactions to factors of rotation consisting of effects of Coriolis acceleration on the human body and vestibular apparatus and on the functional interaction of the vestibular-visual-motor analyzer. It was made clear that the cessation of rotation did not exert a negative influence on the stability of the state, and the character of the stabilographic data in the period of immediate consequence was similar to those registered at the end of the second phase. The recovery period depended on the length of the experiment.

Biochemistry

USSR

UDC 612.17 616.12.092

SOME ENZYMES OF GLYCOSIS AND TISSUE RESPIRATION IN CHRONIC CORONARY INSUFFICIENCY

Kiev GIPERTONICHESKAYA BOLEZN', ATEROSKLEROZ I KORONARNAYA NEDOSTATOCHNOST'
[Hypertension, Atherosclerosis and Coronary Insufficiency. Republican Interdepartmental Collection] in Russian No 8, 1976 pp 57-60

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 N226
Resume]

BEZBOROD'KO, B. N., GOSTISHCHEV, N. N., SKLYAROVA, N. P.,
TARNOPOLO'SKIY, A. V. and YUZVAK, T. G., Medical Institute, Zaporozh'ye

[Text] In 150 patients with chronic coronary insufficiency in the presence of atherosclerotic cardiosclerosis and hypertension, a study was made of the activity of enzymes of glycolysis (LDG and its isoenzymes LDG₁₋₅) and tissue respiration (MDG and its isoenzymes). In patients with atherosclerotic cardiosclerosis combined with cardiac insufficiency, the general activity of LDG and its isoenzymes changes and the activity of MDG and its isoenzymes MDG₁₋₅ is disrupted. The depth of those disruptions is stipulated by the presence of chronic cardiac insufficiency and the severity of the basic illness. It is suggested that a coenzyme normalizing metabolic processes be included in the complex therapy.

USSR

UDC 612.3 616.3

DIGESTIBILITY OF VEGETARIAN FISH MEAT PROTEINS BY PROTEOLYTIC ENZYMES

Moscow TRUDY VNII MORSKOGO RYBNOGO KHOZYAIYSTVA I OKEANOGRAFII (Works of the All-Union Scientific Research Institute of the Marine Fishing Industry and Oceanography) in Russian No 105, 1975 pp 128-130

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R256
by Authors]

TSULADZE, YE. A., and YEGIAZARYAN, S. A., All Union Scientific Research Institute of the Marine Fishing Industry and Oceanography, Moscow

[Text] The rate of digestibility of proteins in vitro, which is one of the most important factors determining the biological value of food products, is determined by the accumulation of products of hydrolysis as a result of enzymatic digestion. It has been established that the proteins of the meat of pond vegetarian fishes (grass carp and silver carp) are digested by proteolytic enzymes better than are the proteins of fishes caught in the southeastern part of the Black Sea (turbot and mullet). References 9.

USSR

UDC 612.17 616.12.092

COMPENSATORY-ADAPTATIVE CHANGES OF ELEMENTS OF THE MICRO CIRCULATORY CANAL
OF THE HEART AND OXIDATION-REDUCTION ENZYMES IN THE MYOCARDIUM IN INFARCTION

Kiev GIPERTONICHESKAYA BOLEZN', ATEROSKLOROZ I KORONARNAYA NEDOSTATOCHNOST'
[Hypertension, Atherosclerosis and Coronary Insufficiency. Republican
Interdepartmental Collection] in Russian No 8, 1976 pp 105-109

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 N249
Resume]

ABUTALIPOV, R. F., IGNAT'YEVA, YE. P., SAMOYLOV, A. P. and SHILO, S. R.,
Scientific Research Institute of Clinical Medicine, Kiev

[Text] The state of the microcirculatory canal in extramural sections of
the coronary vessels of the heart and myocardium was studied by histological,
histochemical and histoenzymochemical methods. The development of
compensatory-adaptative processes was established, manifested in expansion
and revelation of reserve capillaries, their elongation and also their
recalibration. Increase of the activity of the oxidation-reduction enzymes
in the myocardium remote from the zone of affection is also considered a
compensatory-adaptative process.

USSR

UDC 612.17 616.12.092

DYNAMICS OF CHANGES OF THE CONTENT OF CHOLINERGIC SUBSTANCES IN THE BLOOD
OF PATIENTS WITH MYOCARDIAL INFARCTION

Kiev GIPERTONICHESKAYA BOLEZN', ATEROSKLOROZ I KORONARNAYA NEDOSTATOCHNOST'
[Hypertension, Atherosclerosis and Coronary Insufficiency. Republican
Interdepartmental Collection] in Russian No 8, 1976 pp 91-93

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 N250
Resume]

PLENOV, N. N., FEDORISHKO, S. S. and MAZNICHENKO, L. G., Medical Institute,
Kiev

[Text] In 114 patients with myocardial infarction the acetylcholine content
of the blood depended on the size of the focus of necrosis. In the first
days the cholinesterase activity of the serum increased more rapidly than
the acetylcholine level. These two factors created favorable conditions for
the course of metabolic processes in the myocardium on a more economic level,
which was regarded as a manifestation of compensatory-adaptative reactions
of the organism. Tendencies toward normalization of the amount of acetyl-
choline in the blood and equalization of its correlation with the choline-
sterase activity were noted.

USSR

UDC 612.014.461 612.015.31

ADAPTATION OF RATS TO WATER INSUFFICIENCY

Frunze PEREKRESTNYYE ADAPTATSII K PRIRODNYM FAKTORAM CREDY (Cross Adaptations to Natural Factors of the Environment) in Russian, Izdatel'stvo ILIM, 1976 pp 103-109

[From REFERATIVNYI ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R161 by Ye. S.]

ZAKIROV, D. Z.

[Text] Control rats previously adapted and unadapted to xerophagia were kept in individual cells which permitted collecting urine and feces separately. The animals received an especially prepared standard ration. The food components were dried at 105° to a definite moisture content (14-16%). In the course of 7 days the rats adapted to the consumption of dried food and water and to staying alone in interchangeable cells. Then the animals were divided into two groups: the first was deprived of drinking water and the second began to be trained for water insufficiency: for 3 days the rats received only dry food, and on the fourth, water and dry food; this was repeated until the 20th day. From the 21st day the experimental animals were completely deprived of water and received dry food. The period of xerophagia lasted 7 and 17 days for groups 1 and 2 respectively. The body weight, quantity of consumed food and also the pulse rate and number of respirations per minute were recorded. It was shown that the previously adapted rats consumed dry food without water until the 15th day, and the unadapted only to the 3rd or 4th day. In the former, in addition, the weight losses until the 10-12th day were considerably less expressed in comparison with the animals during acute dehydration without preliminary adaptation. In the unadapted rats the ability to tolerate limitation of the water supply proved to be far lower than in the adapted. The survival time of the latter was 17 days on the average, and in the unadapted a total of 7 days. References 8.

USSR

UDC 612.6

SOME ASPECTS OF MAINTENANCE OF THE OPTIMUM OF FUNCTION OF THE LOCOMOTOR SYSTEM OF MAN IN THE PROCESS OF AGING

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975. Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 195-204

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R102 by Author]

PODRUSHNYAK, YE. P., Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Text] To prevent dystrophic and destructive changes of tissues of the osseointerarticular system, factors of effect must be used which can increase the bioenergetic possibilities of the organism and its ability to adapt to environmental conditions. It is shown that with age the mucopolysaccharide elements in the wall of vessels and collagenic fibers of the capsule of the hip and knee joints. Distinctive features of the metabolism of sulfur-containing mucopolysaccharides in the bone and cartilaginous tissue during aging. The inclusion of sulfur in the mucopolysaccharides of young rats is many times higher than in old. Testosterone propionate, placenta extract and hydrocortisone stabilize or intensify that aspect of metabolism and counteract one of the important pathogenetic factors of aging of the bone and cartilaginous tissue. The application of vitamin complexes, of a motor regime (clinically) and ribonuclease (experimentally) delays the development of processes of aging of bone and cartilaginous tissue. References 14.

USSR

UDC 621.32 616.33

EXPERIENCE IN THE USE OF ENDORADIOSOUNDING TO EVALUATE THE FUNCTIONAL STATE OF THE STOMACH AND DUODENUM IN HEALTHY CHILDREN AND CHILDREN WITH DUODENITIS

Sverdlovsk BIORADIOTELEMETRIYA (Bioradiotelemetry. Collection) in Russian 1976 pp 303-307

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R297 by S. D. Groysman]

DEDLOVSKAYA, V. I. and CHEREDNICHENKO, A. M., Medical Institute, Sverdlovsk

[Text] In 12 children with duodenitis the pH values of the contents of the stomach and duodenum were registered with a radio capsule. In most of the ill children (7) the acid-forming activity of the gastric glands had increased and that was combined with partial acidification of the medium in the duodenum. In the presence of well-expressed duodenitis a pH value

greater than 7 was not noted once in the initial section of the duodenum. Only in children who had completed the course of treatment in the clinic was an alkaline medium again detected in the duodenum. Increased acidity of the duodenal contents was encountered identically frequently also during normal gastric secretion. It was concluded that pathological acidification of the duodenal contents, contributing to the development of an inflammatory process, is created not only by increased production of HCl but also by inadequate or untimely entry into the duodenum of alkaline secretions of the pancreas and liver and also, possibly, by disruption of the coordination of the contractile activity of the stomach and duodenum. References 4.

Biophysics

USSR

UDC 612.3.616.3

STATE OF THE INTRAORGANIC BLOOD VESSELS OF THE GASTROINTESTINAL TRACT OF ANIMALS PLACED OUTSIDE A SOLENOID

Cheboksary MAKRO-MIKROSTRUKTURA TKANEY V NORME, PATOLOGII I EKSPERIMENTE (Macro- and Microstructure of Tissues in the Norm, Pathology and Experiment) Collection) in Russian No 2, 1975 pp 58-60

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R257 by S. D. Groysman]

BRILLIANTOVA, A. N.

[Text] A pulsed magnetic field with an intensity of 2628 KA/m, a discharge frequency of 1.72 kHz and a pulse length of 0.6×10^{-3} second was applied on rats placed at distances of 0.5, 1 and 3 meters from a solenoid for 9 milliseconds. Posthumous histological examination showed that in the digestive tract (stomach and large and small intestine) of rats closest to the solenoid the arteries were considerably narrowed, the veins were expanded somewhat, the diameter of vessels varied along their length, and in places the vascular networks were discharged. When the rats were removed from the solenoid those changes in the circulatory system decreased. The vessels of the digestive tract of rats at a distance of 3 meters from the solenoid did not differ substantially from the control.

USSR

UDC 612.014.43/46

MORPHOLOGICAL ANALYSIS OF REACTIONS OF NEURONS OF THE BRAIN OF WHITE RATS UNDER THE EFFECT OF UHF RADIATION

Moscow MATERIALY 1-OY NAUCHNOY KONFERENTSII MOLODYKH UCHENYKH-MORFOLOGOV MOSKVI 1974 (Materials of the First Scientific Conference of Young Morphologists of Moscow 1974. Collection) in Russian, Izdatel'stvo Moskovskogo Universiteta, 1976 pp 128-131

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R479 by Yu. A. Shulagin]

GALKINA, N. S.

[Text] The effect of single irradiation with UHF and a moving permanent magnet with 150 mW/cm^2 (for 5-10 minutes) caused in the brain of rats strong dyscirculatory and dystrophic effects. Dystrophic changes in those rats were expressed mainly in the form of acute swelling of the neurons with the effect of tigrolysis, hypochromatosis and reduction of the RNA, and residual effects in the form of lysis and corrugation of separate neurons. The author shows that in the course of a month after single and 10-day UHF

irradiation of rats a reduction of dyscirculatory and dystrophic effects was observed, and also restoration of the neuron structures, in particular the accumulation of tigroid. However, traces of transmitted irreversible changes of neurons also were detected.

Environmental and Ecological Problems

USSR

UDC 612.014.461 612.015.31

THE GEOCHEMICAL ENVIRONMENT, HEALTH AND DISEASES

Riga FIZIOLOGICHESKAYA ROL' I PRAKTICHESKOYE PRIMENENIYE MIKROELEMENTOV
(The Physiological Role and Practical Application of Trace Elements.
Collection) in Russian, Izdatel'stvo Zinatne 1976 pp 177-192

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R179
by Ye. S.]

KOVAL'SKIY, V. V., Institute of Geochemistry and Analytical Chemistry imeni
V. I. Vernadskiy, Academy of Sciences USSR

[Text] Survey. Chemical elements of the environment and metabolism. The biogeochemical food chain. The geochemical environment, health and diseases on different levels of organization of life in the biosphere. The ecological study of health and endemic diseases. Threshold conceptions of the chemical elements of the geochemical environment. The geochemical environment and endemic and nonendemic diseases. Health, diseases and the evolution of the biosphere. References 23.

USSR

UDC 612.014.43/46

METEOTROPIC REACTIONS OF THE ORGANISM OF A HEALTHY MAN UNDER CONDITIONS OF
THE EUROPEAN NORTH

Moscow GEOGRAFICHESKIYE ASPEKTY EKOLOGII CHELOVEKA (Geographic Aspects of
the Ecology of Man. Collection) in Russian 1975 (1976) pp 190-199

[From REFERATIVNYY ZHURNAL, BIOLOGII No 11 (3) 1976 Abstract No 11 R465
by Yu. A. Shulagin]

ANDRONOVA, T. I.

[Text] Meteotropic reactions of healthy persons under the conditions of the European North (the settlement of Amderma and city of Arkhangel'sk, 1969-1971) were studied in collectives of 579 healthy men who had arrived from the central belt of the USSR and 1061 women who were permanent inhabitants of the North. It was noted that the best expressed meteotropic reactions in those examined in the winter time were increase of the tonus of the vagus nerve, increase of the tonus of the sympathetic part of the nervous system, reduction of the weighted average skin temperature and increase of the weighted average skin moisture, increase of the quantity of Hb and electrolytes, increase of the O₂ content of the blood, increase of the erythrocyte sedimentation, increase of the quantity of leukocytes and thrombocytes and reduction of the reaction of erythrocyte sedimentation, increase of the quantity of leukocytes and thrombocytes and reduction of the amount of

vitamin C in the blood and the presence of a deficit of thiamine and riboflavin. In the spring, meteotropic reactions occupied an intermediate position between the winter and summer reactions in those examined. In the summer the meteotropic reactions were the opposite of those in winter.

References 11.

USSR

UDC 612.014.43/46

METABOLIC ASPECTS OF THE ADAPTATION OF MAN TO CONDITIONS OF THE ARCTIC

Moscow GEOGRAFICHESKIYE ASPEKTY EKOLOGII CHELOVEKA (Geographic Aspects of the Ecology of Man. Collection) in Russian 1975 (1976) pp 200-210

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R463
by Yu. A. Shulagin]

PANIN, L. YE. BELOVA, O. V., OSTANINA, L. S., FILATOVA, T. G.,
TRET'YAKOVA, T. A., and POLYAKOV, L. M.

[Text] An investigation was conducted on construction workers of Noril'sk aged 20-24 years who had lived different periods in the north, from 1 or 2 months to 2 years or more, in different seasons of the year. The author noted the single directivity of seasonal changes of three parameters at once: of sugar, pyroracemic acid and lactic acid in the blood, which indicates that disruptions of carbon metabolism in the process of living in the north are connected with disruption of the activity of pyruvate dehydrogenase. It also is shown that the rate of glycolytic processes in construction workers during the polar night (in December) is higher than during the polar day (in July). It is noted that seasonal fluctuations of the parameters of carbon metabolism of inhabitants of Novosibirsk are expressed to a smaller degree than in the construction workers of Noril'sk.

CLIMATIC AND PHYSIOLOGICAL EVALUATION OF THE NORTHEAST OF THE USSR FROM
THE POINT OF VIEW OF ADAPTATION OF THE RESPIRATORY ORGANS OF MAN

Moscow GEOGRAFICHESKIYE ASPEKTY EKOLOGII CHELOVEKA (Geographic Aspects of
the Ecology of Man. Collection) in Russian 1975 (1976) pp 180-189

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R464
by Yu. A. Shulagin]

MILOVANOV, A. D.

[Text] It is shown that further differentiation of territories according to the difficulty of life of the population is advisable for bioclimatic investigations. For that purpose an analysis was made of an unfavorable time of year (January-February 1972) according to daily observations of weather stations of the Northeast--Seymchany, Magadan, Anadyr' and Mys Shmidta. Taken into account were the meteorological indicators which have mainly an influence on the respiratory organs. Four main bioclimatic regions of the Northeast are distinguished by the author. Region 1, of great difficulty, occupies an extensive area of the continental regions from east of the Kolyma River to the Chukotskiy peninsula. In that region the principal pathogenic effect on the human respiratory organs is exerted by the coldness and dryness of the air. Region 2, of high difficulty, is within the limits of a narrow belt of coast of the Sea of Okhotsk containing the city of Magadan and coastal settlements. In region 2 it is noted that the mutually intensifying influence of low territories and stormy winds disrupts the normal respiratory cycle of man and that the wind regime in combination with frequent and sharp drops of O₂ density and contamination of the atmosphere leads to a constant excessive load on the bronchopulmonary apparatus. Region 3, of special difficulty, occupies the territories of the Anadyrskaya lowland and regions of Chukotka adjacent to the coast of the Bering Sea. It is noted that the special difficulty of human life in region 3 is explained by the greater severity and contrasting variability of the weather than at Magadan, with considerable drops of the O₂ density, and that this causes extreme stress in the work of the bronchopulmonary apparatus. Region 4, of extreme difficulty, is on the coast of the Arctic Ocean and in continental regions north of the polar circle. In that region the respiratory organs are affected by the extreme severity and very high contrastive variability of the weather, the intense wind regime and the unusually high and rapid drops of atmospheric pressure, temperature and O₂ density. The author assumes that the polar auroras and magnetic and electrostatic disturbances in the atmosphere accompanying them affect the processes of external respiration under conditions of region 4. References 9.

USSR

UDC 612.766.1 612.825.8

PRINCIPLES OF SELECTION OF ALLOWABLE CONDITIONS OF THE MICROCLIMATE OF PRODUCTION QUARTERS

Moscow NAUCHNYYE RABOTY INSTITUTOV OKHRANY TRUDA VTsSPS (Scientific Works of Labor Safety Procedures of the All-Union Central Trade Council) in Russian No 100, 1976 pp 26-31

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R499 by M. Ye. Kramnik]

TETEREVNIKOV, V. N., PAVLUKHIN, L. V., and KUKSINSKAYA, T. V.

[Text] Investigations refined the allowable levels of temperatures and comfort conditions during work of different severity in different climatic zones. The practical use of the obtained data will permit avoiding errors in the planning and evaluation of ventilation and air conditioning systems, increase their effectiveness and improve working conditions. References 28.

USSR

UDC 612.766.1 612.825.8

ELECTROCARDIOGRAPHIC CHARACTERIZATION OF CARDIAC ACTIVITY OF POLAR WORKERS OF ANTARCTICA

Moscow ANTRARKTIKA (Antarctica. Commission Report) in Russian, Iadatel'stvo Nauka No 15, 1976 pp 145-156

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R503 Resume]

DERYAPA, N. R. and VENTSENOSTSEV, B. B.

[Text] The definite seasonal nature of EKG indices and their combinations in the process of adaptation to the length of annual wintering indicate the leading importance of vegetative phenomena on cardiac activity. The changes of tonus of the sympathetic and parasympathetic sections of the vegetative nervous system depend on the contrastive light regime of Antarctica. In some persons pathological changes arise, as far as EKG signs of ischemic cardiac disease. The unidentical level of health of polar workers, the wintering conditions, and weather, heliogeophysical and other factors are reasons for the unidentical results of investigations during different expeditions. References 17.

USSR

UDC 612.766.1 612.825.8

THE STATE OF THE VEGETATIVE NERVOUS SYSTEM OF POLAR WORKERS IN ANTARCTICA

Moscow ANTARKTIKA (Antarctica. Commission Report) in Russian, Izdatel'stvo Nauka No 15, 1976 pp 126-144

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R504
Resume]

DERYAPA, N. R. and VENTSENOSTSEV, B. B.

[Text] During three expeditions 203 polar workers aged 23-54 years were under the observation of the authors. In the process of adaptation various changes of the vegetative nervous system formed in the workers. These shifts reflect reorganization of the body under new conditions of existence and have mainly a normative adaptational character. A definite seasonal cyclicity was detected. Toward the end of one year's stay of a worker in Antarctica an unusual stabilization of vegetative functions on a new level as compared with the start of the wintering was noted. There was no serious pathology of the vegetative nervous system. No distinct correlations were noted between general disturbances of the health and the vegetative symptomatics. References 33.

USSR

UDC 612.766.1 612.825.8

ADAPTATION OF SAILORS IN LONG OCEAN VOYAGES

Leningrad ADAPTATSIYA MORYAKOV V DLITEL'NYKH OKEANSKIKH PLAVANIYAKH in Russian, Izdatel'stvo Meditsina 1976, 127 pp with illustrations

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R505 K
Resume]

STRAKHOV, A. P.

[Text] Illuminated in the monograph is the problem of the adaptation of sailors of the merchant marine to conditions of long (round-the-world) ocean voyages in the middle and tropical latitudes. Presented are the materials of personal investigations of the author in 1965-1971 on vessels of the Baltic Marine Steamship Company in comparison with the data of the Soviet and foreign literature. The main attention was given to dynamic evaluation of the state of the nervous and cardiovascular systems, and also the morbidity. All variants of the process of adaptation, from physiological shifts to prepathological disturbances of the health, are presented in a close interconnection with the working and living conditions of sailors, and also with natural factors of the regions of ocean voyages. The necessary comparisons are made with similar investigations in other geographic zones. References 312.

USSR

UDC 612.766.1 612.825.8

INFLUENCE OF PRODUCTION NOISE ON THE FUNCTIONAL STATE OF THE ACOUSTIC ANALYZER OF POLAR WORKERS

Moscow INFORMATSIONNYY BYULLEHEN' SOVETSKOY ANTARKTICHESKOY EKSPEDITSII (Information Bulletin of the Soviet Antarctic Expedition) in Russian 1976 No 93 pp 60-67

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R511 by M. Ye. Kramnik]

SOROKO, S. I.

[Text] The functions of the acoustic analyzer of polar workers--electric power plant machinists and radio operators--were investigated with an AP-02 audiometer to determine occupational pathologies. The thresholds of acoustic sensitivity of those workers differed substantially from a control. Wintering caused practically no change in the acuteness of hearing of the control group. In the electric power plant machinists during the same time a reduction of the acuteness of hearing of 50-60 decibels was noted, and an increase of the acoustic thresholds in a broad range of frequencies, especially in the region of 3000-8000 Hz. After a watch an especially clearly expressed functional reduction of hearing was noted in the electric power plant machinists and radio operators, and they both made subjective complaints (noise in the ears, headaches and poor sleep). References 10.

USSR

UDC 612.766.1 612.825.8

INVESTIGATIONS OF HUMAN SENSORIMOTOR REACTION UNDER CONDITIONS OF HYPOXIA

Frunze PEREKRESTNYYE ADAPTATSII K PRIRODNM FACTORAM SREDY (Cross Adaptations to Natural Environmental Factors. Collection) in Russian, Izdatel'stvo Ilim, 1976 pp 191-196

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R520 by M. Ye. Kramnik]

TASHMATOV, I. Yu.

[Text] The latent period of visuomotor reaction was studied in men 19-23 years old under mountainous conditions (60 days, 3000 meters above sea level), and the influence of physical load (running 1 km over broken terrain with a time limit) on reaction time under mountainous conditions. In one case the reaction time was measured on the 3rd, 18th, 34th, 40th, 55th and 60th days of stay in the mountains, and in the 2nd before physical load (background) and 5, 15 and 30 minutes after physical load. The reaction time is

restored 10-15 minutes after physical load under high and low mountain conditions. The dynamics of the process of adaptation of reaction time to hypoxia are similar to the adaptation of most physiological parameters. References 3.

USSR

UDC 612.766.1 613.796/799

CARDIOVASCULAR AND RESPIRATORY SYSTEMS AND PHYSICAL WORKING CAPACITY
DURING A BRIEF STAY IN MOUNTAINOUS CONDITIONS

Frunze PEREKRESTNYYE ADAPTATSII K PRIRODNAM FAKTORAM SREDY (Cross Adaptations to Natural Environmental Conditions. Collection) in Russian Izdatel'stvo Ilim, 1976 pp 197-216

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R537 by M. Ye. Kramnik]

IMANKULOV, D. I. and TURKMENOV, M. T.

[Text] On students 18-24 years old, who had ascended to a height for the first time without preliminary training, studies were made of the influence of a height of 3200 meters, sport exercises and periodical gradually increasing rises to 4000 meters (a regime of "pulsating adaptation") on the cardiovascular and respiratory systems and gas exchange. The investigations were carried out during 42 days of stay in mountainous conditions and in the course of a 3-month re-adaptation. The indices were determined 30 seconds before and 30 seconds after the completion of work at 300, 600 and 900 kg (force)/minute (a power of 50, 100 and 150 W). Phase changes of maximal physical work capacity are noted during a brief stay in mountainous conditions. A "pulsating" regime of adaptation in mountainous conditions can be used as a method which increases the physical work capacity of the organism under mountainous conditions and in the period of re-adaptation. References 23.

USSR

UDC 612.766.1 613.796/799

ADAPTIVE REACTIONS OF HEMOSTASIS IN PERSONS WITH DIFFERENT DEGREES OF PHYSICAL TRAINING

Frunze PEREKRESTNYYE ADAPTATSII K PRIRODNAM FAKTORAM SREDY (Cross Adaptations to Natural Environmental Conditions. Collection) in Russian, Izdatel'stvo Ilim 1976 pp 169-174

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R536 by M. Ye. Kramnik]

MALZHUGA, A. V.

[Text] Reactions of hemocoagulation under the effect of mountainous factors were studied in persons with different degrees of physical training. On the basis of special functional tests for physical endurance 24 men 18-19 years old were divided into two groups, strong and weak. Observations were made in the foothills (1200 meters) and in the period of stay in mountains (3800 meters) on the 8th and 45th days. Blood was taken from a finger and a vein in the morning on an empty stomach. Staying in mountains considerably changes the system of blood coagulation, with a maximum on the 40-45th days. References 16.

USSR

UDC 612.014.482.5 613.693

SOME GENERAL PATTERNS AND THE PHASE CHARACTER OF THE FORMATION OF MOUNTAIN ADAPTATION

Frunze PEREKRESTNYYE ADAPTATSII K PRIRODNAM FAKTORAM SREDY (Cross Adaptations to Natural Environmental Conditions. Collection) in Russian, Izdatel'stvo Ilim 1976 pp 33-56

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R551 by M. Ye. Kramnik]

MIRRAKHIMOV, M. M.

[Text] Three phases of adaptation are described; initial (emergency)--adaptive reactions are mobilized in an emergency (at a height of 3200 meters the phase lasts 10 days), transitional (physiological indices reach the background level, and at a height of about 3 km the phase lasts 15-20 days), and stable. Of very great importance for the development of individual adaptation are the genetic aspect of training, the consolidation of vegetative memory and social measures of protection against extreme effects of climatic factors. Schemes of adaptive mountain diseases of man and the mechanisms of their origination are presented. References 31.

USSR

UDC 612.766.1 612.825.8

WORKING CAPACITY OF MAN AND RESULTS OF ITS STUDY IN DIFFERENT CLIMATIC ZONES OF THE USSR

Leningrad RESURSY BIOSFERY (Resources of the Biosphere. Collection) in Russian, Izdatel'stvo Nauka No 3, 1976 pp 163-179

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R496
Resume]

LIKHNITSKAYA, I. I.

[Text] The results of study of sex and age features of the indices of working capacity in persons of different occupations in different climatic zones of the country are described. It is shown that the values of the aerobic working capacity in representatives of various occupations aged 20-30 years are commensurable with those in similar groups in other countries of the northern hemisphere but differ from them in a slower reduction of the indices with age. Constant living in the northern regions of the USSR does not contribute to a substantial reduction of the level of aerobic working capacity, but it is moderately lowered in representatives of southern and high-mountain regions. Methodical questions connected with evaluation of the working capacity of man and the principles of use of indices of working capacity in forecasting labor potentials of man under productive conditions are discussed. References 48.

Molecular Biology

USSR

UDC 612.833.81 591.51

MOLECULAR GENETIC ELEMENTS OF MEMORY AND THE MEMORY OF THE BRAIN

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY
(Memory in Mechanisms of Normal and Pathological Reactions. Collection)
in Russian, Izd-vo Meditsina 1976 pp 200-220, 377-379

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P 469
by R. D.]

NEYFAKH, S. A., and GAYTSKHOKI, V. S.

[Text] Examined are the molecular genetic mechanisms of the storage and reproduction of information with which the cell operates in performing each function--the genetic code, the realization of genetic information, the organization of genetic material and control of the expression of genes, and protein-nucleus "recognition" and its role in the realization of the genetic memory of the cell. It is emphasized that although training and memory are based on genetic memory, information transmission in the nervous system must differ from genetic information transmission in at least two respects; 1) signals of neural information must carry information not about the molecular structure but about the super-molecular structures and 2) the existence should be assumed not of a single code and not of only one "horizontal" information transmission, but of a hierarchy of codes and "vertical" information transmission.

USSR

UDC 612.6

CHELATING AGENTS AS POSSIBLE MEANS OF PROLONGATION OF LIFE

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975 Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 150-158

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R93
by Author]

DUBINA, T. L., Sector of Gerontology, Academy of Sciences Belorussian SSR, Minsk

[Text] Long periodic administration of Na₂-EDTA increases the mean length of life of rats, although that effect depends on the sex of the animals and the age at which the administration started. One possible molecular mechanism of the effect of the administration can be influence on the cross-linkages of collagen. However, preliminary investigation of penicillamine, which is capable of cleaving the cross bonds, did not reveal a positive effect of that agent on the length of life of rats. References 33.

USSR

UDC 612.6

INCREASE OF GENOME STABILITY--ONE OF THE MAIN BIOLOGICAL PREREQUISITES FOR
THE LENGTHENING OF LIFE

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975
Biological Possibilities of Increasing the Length of Life) in Russian 1976
pp 74-80

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R86
by Author]

VILENCHIK, M. M., Institute of Biophysics, Academy of Sciences USSR, Pushchino

[Text] On the basis of computational analysis of the thermal stability of DNA, numerous experimental data on the role of DNA damage and repair in aging and the influence of temperature on that process it is assumed that thermal damages of DNA and the activity of the system of their repair determine the biological limit of the length of life of many organisms. Included are discussions of the results of investigations indicating the possibility in principle of increasing the effectiveness of function of repairing enzymes in the cell, in particular through activation of the process of their synthesis. References 29.

Pharmacology

USSR

UDC 612.6

COMPARATIVE CHARACTERIZATION OF SOME EFFECTS ON THE LENGTH OF LIFE OF ANIMALS

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975 Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 138-150

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R94 by Authors]

FROL'KIS, V. V., BOGATSKAYA, L. N., STUPINA, A. S., VERZHIKOVSKAYA, N. V., MARTYNENKO, O. A., KVITNIKSKAYA-RYZHOVA, T. Yu., KOVTUN, A. I., KOZINETS, T. N., KOSTYRYA, N. F., and YANOVSKAYA, N. V., Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Text] Presented in the work are the results of study of the influence, on the indices of biological age and length of life of male rats, of olivomycin, dextramin, Na succinate, carboxylin, DNA and stress effects short in length but different in type. Under the influence of course administration of the preparations (with the exception of DNA) and stress the mean and maximal length of life and time of 50% mortality of the animals increases. The most clearly expressed effect is exerted by olivomycin. The increase in the length of life is accompanied by a slight reduction of gas exchange, increase of the stability of erythrocytes, delay of the accumulation of the total content of lipids and their fractions in the blood and organs and preservation of the content and ratio of albumins and globulins, nucleic acids and adenine nucleotides, and less well expressed structural changes in the organs and tissues. References 21.

USSR

UDC 612.76

PHYSIOLOGICAL AND BIOCHEMICAL CORRELATES OF PATHOLOGICAL REACTIONS I. PHENIC INVESTIGATIONS

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1, 1976 pp 134-144

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P800 Resume]

KAMBAROVA, D. K., POZDEYEV, V. K., and ILYUKHINA, V. A., Institute of Experimental Medicine, Academy of Medical Sciences USSR, Leningrad

[Text] On the basis of comparative study of the dynamics of neurophysiological (pulsed activity of neurons and slow electrical processes of the brain), clinical and biochemical indicators (the intensity of excretion of adrenaline, noradrenaline, dopamine, dopa and 5-hydroxy-indolylacetic acid),

investigated in patients with parkinsonism under ordinary conditions and on a background of the administration of pharmacological agents active with respect to adrenergic, cholinergic and serotonergic mediation, some mechanisms of symptomatic and pathogenetic paths of effect on the appearance of disease were examined. References 31.

Physiology

USSR

UDC 612

FURTHER ANALYSIS OF CODED SUPPLYING OF INFORMATION AND CONTROL FUNCTIONS OF THE BRAIN

Leningrad FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1, 1976 pp 39-49

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract 11 P7 by A. Fel'dman]

BUNDZEN, P. V., Institute of Experimental Medicine, Academy of Sciences USSR

[Text] The activity of neurons of the optic thalamus, nucleus caudatus and globus pallidus has been picked up by electrodes implanted in the brain of patients with Parkinson's disease. During the pronunciation of words the pulses of a single neuron are grouped and those of different neurons synchronized. Possible mechanisms of information processing in the process of thinking and decision making are discussed. References 26.

USSR

UDC 612.143 616.12-008.331

INFLUENCE OF EMOTIONAL STRESS ON VEGETATIVE MANIFESTATIONS AND THE STATE OF THE SYMPATHO-ADRENAL SYSTEM IN PATIENTS WITH HYPERTENSION AND CHRONIC ISCHEMIC CARDIAC DISEASE

Moscow AKTUAL'NYYE PROBLEMY SERDICHNOSOSUDISTOY PATOLOGII (Urgent Problems of Cardiovascular Pathology. Collection) in Russian No 2 1975 pp 223-226

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3), 1976 Abstract No 11 N365 by T. D. Pliss]

SOKOLOV, YE. I. BELOVA, YE. V., SOFIYEVA, I. E., POPOVA, T. A., and MAL'TSEVA, A. S.

[Text] Emotional load activates the sympatho-adrenal system, as is demonstrated by elevation of the level of catecholamines in the urine in a period of stress. The elevated sympatho-adrenal activity can cause tachycardia, elevation of arterial pressure, disappearance of sinus arrhythmia and acceleration of the pulse rate. Downward deflection of the T wave and shift of the ST segment are noted. This fact corresponds to the concept of the participation of excess sympatho-adrenal activity in the pathogenesis of myocardial hypoxia in ischemic cardiac disease. References 3.

USSR

UDC 612

PHYSIOLOGY OF SENSORY SYSTEMS

Leningrad FIZIOLOGIYA SENSORNYKH SISTEM in Russian, Izd-vo Meditsina 1976, 399 pp with illustrations

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract 11 P2 by A. Fel'dman]

BATUYEV, A. S., editor

[Text] The general principles of the functioning of sensory systems (visual, auditory, speech, vestibular, visceral, cutaneous, skeletal-muscular, olfactory and gustatory) are presented. The processing of sensory information by various sections of the brain is examined and clinical aspects and bionic approaches to study of sensory systems are discussed. References 570.

USSR

UDC 612

REQUIREMENTS FOR A COMPLEX OF EQUIPMENT FOR REGISTERING THE SUMMARY CELLULAR ACTIVITY IN SINGLE NEURONS DURING EXTRA- AND INTRACELLULAR PLACEMENT OF MICROELECTRODES

Gor'kiy TRUDY GOR'KOVSKOGO MEDITSINSKOGO INSTITUTA (Works of Gor'kiy Medical Institute) in Russian No 65, 1975 pp 7-49

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract 11 P8 by A. Fel'dman]

CHIRKOV, V. D., Gorkiy Medical Institute

[Text] A brief description is given of electrophysiological methods and apparatus, in particular the equipment for manufacture of glass and metallic (tungsten) microelectrodes and cathode followers (in t. ch. [expansion unknown] with field-effect transistors) and methods of registering the activity of nerve cells during movement of an animal or pulsations of the brain. References 73.

USSR

UDC 612.8.001.57

MATHEMATICAL ESTIMATION OF THE DISTRIBUTION OF THE ELECTRIC FIELD POTENTIAL IN THE REGION OF SYNAPTIC CONTACT

Kaliningrad TEZISY DOKLADOV I KONFERENTSII "MATEMATICHESKAYA TEORIYA BIOLOGICHESKIKH PROTSESSOV" 1976 [Summaries of Reports of the First Conference on "Mathematical Theory of Biological Processes" 1976] in Russian 1976 pp 389-391

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract 11 P 43 by M. S. Bukhtiyarov]

IVANOV, YU. N., and SHUGUROV, O. A., Dnepropetrovsk University

[Text] During the time of synapse activation the value of the electric field potential (EFP) under it, induced by subsynaptic current, differs from the values of the EFP at other points of intracellular space by 0.5-3 mV. The presence outside the cell in the region of synapse of islets of glial cells leads, according to the model, to increase of the absolute values of the EFP by 2-6 mV, which with consideration of the intracellular EFP creates a potential difference of 2-3 mV, additionally applicable to the subsynaptic membrane. It is assumed that the polarization of the subsynaptic membrane forming as a result of that can explain its nonelectrogenic character. References 2.

USSR

UDC 612.85

INVESTIGATION OF THE PERCEPTION OF ISOLATED VOWEL CARRIERS IN THE RUSSIAN LANGUAGE (HEALTHY PERSONS AND PATIENTS WITH THE SYNDROME OF SENSORY AND MOTOR APHASIA)

Leningrad FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2, No 1, 1976 pp 81-90

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3), 1976 Abstract No 11 P 252 by B. M.]

AVAKYAN, R. V., Scientific Research Institute for Diseases of the Ear, Throat, Nose and Speech, Leningrad

[Text] In the work new material has been obtained on the specifics of disorders of the perception of isolated vowels on different levels of the processing of signals (acoustic image, phonetic image and phonemic image). A new aspect was revealed of the processing of elements of verbal signals by the brain--the role of the operative memory. References 17.

USSR

UDC 612.816

NEUROCHEMICAL PRINCIPLES OF INFORMATION CODING AND TRANSMISSION ON THE
SYNAPSE LEVEL

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY
(Memory in the Mechanisms of Normal and Pathological Reactions) in Russian
Izd-vo Meditsina 1976 pp 96-121, 362-365

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract 11 P44
by V. I. Kaplan]

BORODKIN, YU. S.

[Text] Survey. The contemporary state of the neuropharmacology of mediators and receptors of central synapses is examined. A brief biochemical and functional characterization is given of proteins as the principal macromolecular components of the receptive sections of the postsynaptic membrane (structure, conformational reorganizations and cooperative systems). Note is made of the role of the membrane in the generation and propagation of a neural pulse and in the mechanisms of the effect of neutronic media. The latest data on receptors (structure, components, the role of the prostaglandins, the cholinoreceptor). Concepts of the role of synapses and chemical coding of information in mechanisms of brief and long memory are analyzed critically.

USSR

UDC 612.85

ELECTROPHYSIOLOGICAL METHODS OF INVESTIGATING THE VISUAL ANALYZER

Kiev PRIMENENIYE RADIODELEKTRONNYKH PRIBOROV V BIOLOGII I MEDITSINE
[Application of Radioelectronic Instruments in Biology and Medicine.
Collection] in Russian IZD-vo Naukova Dumka 1976 pp 63-76

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P267
by Yu. I. Kuz'min]

GYULLING, E. V., and BAKAY, E. A.

[Text] A survey of physiological procedures used in experimental conditions and in the clinic to evaluate the function of various sections of the auditory system. Methods of objective audiometry based on the registration of motor reactions, galvanic skin reflex, cardiac activity and the elementary activity of the brain are described. Procedures are presented for the registration of microphone effect and the potentials of the action of the auditory nerve and evoked potentials of the cerebrum. References 26.

USSR

UDC 612.886.1 85.33

MODEL INVESTIGATION OF THE MECHANISM OF FUNCTIONING OF THE ACCEPTOR OF ACTION
IN THE SYSTEM OF THE VESTIBULAR ANALYZER

Kaliningrad TEZISY DOKLADOV I KONFERENTSII "MATEMATICHESKAYA TEORIYA
BIOLOGICHESKIKH PROTSESSOV" 1976 [Summaries of Reports of the First Conference
on "Mathematical Theory of Biological Processes" 1976] in Russian 1976
pp 399-401

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P276
by I. V. Orlov]

KRUT'KO, V. N., Scientific Research Institute of Medical and Biological
Problems, Ministry of Health USSR

[Text] A mathematical model was constructed of the processing by the system of semicircular canals of a large number of signals from separate vestibular receptors in which in the central nervous system a maximal value of the useful signal-to-noise is assured. To do that it is necessary that the presence of stimulus vary the activity of neurons in the corresponding blocks of the central nervous system in proportion to the projections of the stimulus on the axis of the regular Cartesian coordinate system XYZ, connected with the orientation of the body in space. In the mathematical model it was assumed that the activity in the given blocks is compared with the activity of the acceptor of effect and the correction is accomplished on the basis of the discrepancy. Formulas are derived for calculations of the weight coefficients for the block B_x , corresponding to the projection OX of the system XYZ, and also for blocks B_y and B_z . On the basis of the mathematical model a formula was obtained which links the value of the discrepancy Δ with the values of the angles of deflection of the cupulae in the semicircular canals. The value of Δ correlates with the expressiveness of the vegetative disorders in vestibular tests and can serve as a quantitative criterion of the tolerance of vestibular effects. References 6.

USSR

UDC 612.76

MOTOR UNITS AND THE MOTONEURON POOL

Leningrad FIZIOLOGIYA DVIZHENIY (Physiology of Movements. Collection) in Russian Izdatel'stvo Nauka 1976 pp 69-101

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P777 by L. P. Kudina]

PERSON, R. S., Institute of Information Transmission Problems, Academy of Sciences USSR, Moscow

[Text] Survey. Contemporary concepts of the structure and function of motor units are presented. On the basis of literature and his own data the author examines the problem of synchronization of discharges of muscular units and discusses questions of the controlling function of the motoneuron and the motoneuron pool. References 156.

USSR

UDC 612.825

ELECTROENCEPHALOGRAPHY, REGISTRATION EQUIPMENT AND METHODS OF PROCESSING ELECTROENCEPHALOGRAMS

Kiev PRIMENENIYE RADIODELEKTRONNYKH PRIBOROV V BIOLOGII I MEDITSINE [Application of Radioelectronic Instruments in Biology and Medicine. Collection] in Russian Izd-vo Naukova Dumka 1976 pp 40-63

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P364 by T. A. Meshkova]

TSAPENKO, V. F.

[Text] A brief account of EEG theory and methods. The main requirements presented for instruments are indicated. The following questions are illuminated: the history of the study of the bioelectric activity of the cortex, contemporary theories of the origin of the cortical rhythmicities, reflection of the functional state on the EEG, procedure of electrode implantation, and methods of leading, registration and analysis of EEG. References 28.

USSR

UDC 612.825

EEG POTENTIALS FIELD THEORY IN A MODEL OF FINE MEMBRANES OF THE BRAIN

Kaliningrad TEZISY DOKLADOV I KONFERENTSII "MATEMATICHESKAYA TEORIYA BIOLOGICHESKIKH PROTSESSOV" 1976 [Summaries of Reports of the First Conference on "Mathematical Theory of Biological Processes" 1976] in Russian 1976 pp 387-388

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P365 by T. A. Meshkova]

GUTMAN, A., and SHIMOLYUNAS, A., Scientific Research Institute of Cardiology, Kaunas Medical Institute

[Text] It is shown that electrically the head is modeled by a three-layered cable to which two-dimensional field theory has been applied. Two models were investigated: 1) a model of a three-layered two-dimensional spherical cable in which we neglect openings of the real cable and 2) a model of a three-layer plane cable in which cranial curvature is ignored. The EEG sources are described by point dipoles and double disk-layers of different radius, set at an arbitrary depth and oriented tangentially or radially.

1. The estimates of potentials on the scalp obtained in models demonstrate the low sensitivity of the EEG field for describing the geometry of the cranium. 2. To estimate the ECoG potentials a model of the isolated sphere is sufficient. This permits analyzing without additional difficulties tangentially oriented dipolar sources (walls of the cortical fissure, etc). 3. A formula is presented for obtaining the EEG potentials in a system of angular spherical coordinates from the field of potentials of the epicortical ECG, which explains why the potentials synchronous on the large surface of the cortex are well registered in the EEG and comparable in amplitude with the ECoG (in particular ECoG of a deep subcortical source is weakened little by the cerebral tegmina). 4. Potentials led out by electrodes separated by a distance of less than 2 cm are identical. 5. EEG potentials of a tangentially oriented dipole are 2-3 times smaller than the radial. 6. A model can be useful for finding a source on the basis of the EEG potentials distribution.

USSR

UDC 612.825

DYNAMICS OF SPATIAL RATIOS OF THE PHASES OF DOMINANT OSCILLATIONS OF THE BIOPOTENTIALS OF THE BRAIN IN ADULTS AND CHILDREN

Leningrad FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1, 1976 pp 100-108

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P368
Resume]

APANASIONOK, V. S., Institute of Evolutionary Physiology and Biochemistry, Academy of Sciences USSR, Leningrad

[Text] In an investigation of the space-time distribution of the phases of EEG alpha-waves it was established that 63% of the alpha-waves of the field of biopotentials of the brain of an adult human are spatially organized and have a phase gradient in sagittal direction. Series of waves with different phase gradients replace one another quasiperiodically. The maximal length of successive alpha-waves with an identical spatial phase distribution reaches 15-25 waves. The first signs of space-time organization of the field of biopotentials of the brain are already observed in children in the first months of life. From the age of about 6 years the probability of maintenance of a uniform phase structure of two adjacent waves starts to exceed 0.5. In proportion to the development of children an increase in the quantity of spatially organized waves is observed. However, a relatively slow increase of the length of the series of waves with identical phase ratios indicates completion of the formation of the spatial coherence of dominant EEG rhythms even after the 18th year of age. References 23.

USSR

UDC 612.76

THE INFLUENCE OF ARTICULAR AFFERENTATION ON THE REFLEX ACTIVITY OF HUMAN MUSCLES

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1, 1976 pp 131-133

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P773
Resume]

EL'NER, A. M., Institute of Information Transmission Problems, Academy of Sciences USSR, Moscow

[Text] The results of investigation of patients with defects of the afferents of tendon reflex but preserved feeling of movement in the joints permit the conclusion that afferentation from the joint does not itself have an effect on the activity of the muscles serving it. It is assumed that if the effect of articular afferentation on the activity of muscles is possible, it is only in combination with influences facilitating that reflex. References 21.

USSR

UDC 612.825

ANALYSIS OF NEUROPHYSIOLOGICAL MECHANISMS OF THE TRANSFORMATION OF CODE FORMS
OF VERBAL SIGNALS ON THE LEVEL OF NEURON-GLIAL SYSTEMS

Leningrad FIZIOLOGIYA CHELOVEKA (Human Physiology) Vol 2 No 1, 1976 pp 50-58

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P391
Resume]

KROPOTOV, YU. D., and MALYSHEV, V. N., Institute of Experimental Medicine,
Academy of Medical Sciences USSR, Leningrad

[Text] The article is devoted to study of the neural processes during the processing and recording of verbal information. Complex use of the registration of slow electric potentials and the multicellular pulsed activity of neuron populations (by means of electrodes implanted in the brain a long time); investigation of the dynamics of the oxygen pressure and impedance of brain tissue permitted the author to estimate quantitatively from various aspects the functional changes of the neuron-glial systems of the brain during the remembering and decoding of verbal information. Automatic selection of the patterns of the intervals between pulses and the wide use of digital computers have contributed to the processing of a large volume of experimental data. References 29.

USSR

UDC 612.6

GENETIC CHARACTERISTICS OF THE EEG AND LONGEVITY

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975 Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 63-64

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) Abstract No 11 R109 by Authors]

MAN'KOVSKIY, N. B., BELONOOG, R. P., and KUZNETSOVA, S. M., Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Text] As a result of study of the background and functional EEG of 280 relatives of aged persons 17 to 95 years old and 400 persons of a control group of corresponding ages distinctive constitutional features of the bioelectrical activity of the brain were established in the relatives of aged, expressed in a high frequency of the alpha-rhythm, stability of the alpha-index, a short latent period of reaction to light and dominance of a high level of assimilation of attached rhythms. The indices of electrophysiological bases of emotional activity (theta-rhythm) of relatives of the aged indicate their emotional stability and adequacy. Age changes of the principal EEG indices in the population of relatives of the aged set in 15-20 years later than in the control group. References 36.

USSR

UDC 612.766.1 612.825.8

INFLUENCE OF LOW DEGREES OF HYPOXIA ON THE QUALITY OF AN OPERATOR'S WORK

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2, No 1, 1976 pp 127-130

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R498
Resume]

MIROLYUBOV, A. V.

[Text] On a model of single-coordinate tracking of a sinusoidal signal the quality of an operator's work was studied during the respiration of air and a hypoxic mixture (15.8% O₂). Analysis of the acts of tracking permitted distinguishing four types of tracking as a function of the number of waves of overcorrection to emerge on the trajectory of the given signal and precision of tracking along the course of the trajectory. It was established that respiration of the given hypoxic mixture does not cause disruption of the process of running in but certainly reduces the quality of work on account of worsening of the transitional process during emergence on a given trajectory. Worsening of the quality of activity was not perceived subjectively. Substantial individual differences were noted in the analysis of the given hypoxia. References 7.

USSR

UDC 612.014.482.5 613.693

RHEOENCEPHALOGRAPHIC AND RHEOVASOGRAPHIC INDICES AFTER 4-DAY HYPOKINESIA IN ANTIORTHOSTATIC POSTURE No 2

Kalinin VOZRASTNYYE OSOBENNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motor-visceral Regulation During Various Types of Muscular Activity. Collection) in Russian No 3, 1975 pp 65-66

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R560 by Yu. A. Shulagin]

DEGTYAREV, P. G. and MOGENDOVICH, M. R.

[Text] In an experiment 15 young men were in 4-day hypokinesia and antiorthostatic posture No 2 with the legs bent by 30-35° or correspondingly bent at the hip and knee joints. Before and at the end of the experiment those tested completed an active functional orthostatic test and their hemodynamic indices were taken. It was noted that 4-day hypoxia and antiorthostatic posture No 2 according to the indications of the functional orthostatic test led to changes of the hemodynamics in those tested in the form of reduction of the degree of filling with blood and correspondingly increase of the tonic tension of the central and peripheral arterial bed. References 6.

USSR

UDC 612.833.81 591.51

SPEECH HEARING UNDER CONDITIONS OF TEMPORARY INACTIVATION OF ONE HEMISPHERE

Leningrad FIIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2, No 1,
1976 pp 71-80

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P672
Resume]

BALONOV, L. YA., Institute of Evolutionary Physiology and Biochemistry,
Academy of Sciences USSR, Leningrad

[Text] Under conditions of temporary inactivation of one hemisphere, arising after unilateral electroconvulsive seizure, a study was made of the intelligibility of phonemes (vowels and consonants), logotomes and words. It is shown that during inactivation of the left hemisphere symptoms of total, sensory and motor aphasia arise. After the apathic disorders disappear there are a reduction of vocal attention and vocal activity, elevation of the thresholds of detection of sounds of speech and worsening of the intelligibility of phonemes, logotomes and words. Upon inactivation of the right hemisphere vocal activity increases, the thresholds of detection of sounds of speech are lowered and the intelligibility of phonemes, logotomes and words improves. However, when speech is masked with white sound and when it is filtered by a high-frequency filter the intelligibility of speech is reduced, which is not observed during inactivation of the left hemisphere. Thus the right hemisphere exerts a regulatory influence on the speech centers of the left hemisphere: under ordinary conditions the right hemisphere depresses the activity of those centers, and under the conditions of their difficult functioning facilitates the activity of the speech centers, providing noiseproofing of speech perception. References 34.

USSR

UDC 612.821.7

THE FUNCTIONAL ROLE OF THE SLOW-WAVE PHASE OF SLEEP

Tbilisi MATERIALY III KONFERENTSII MOLODYKH UCHENYKH. INSTITUT FIZIOLOGII
AN GRUZ SSR (Materials of the Third Conference of Young Scientists.
Institute of Physiology, Academy of Sciences Georgian SSR) in Russian, Izd-vo
Metsniyereba, 1976 pp 29-30

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P691
by B. M.]

MALOLETNEV, V. I., CHACHANASHVILI, M. G., and TELIYA, Z. A.

[Text] Changes of sleep structure were studied in people after intensive physical loads and after forced weight loss in a steam bath. The observations were conducted on 20 masters of various sports, the sleep of each of which was registered during 6-8 successive nights (a total of 133 nights). Such indicators were analyzed as the change of the percentage ratios of different stages, the change of the structure of the first cycle, the dynamics of the LP [expansion unknown] of the paradoxal phase of the first cycle, the pattern of the beginning and end of the paradoxal phase, the distribution of the slow-wave phase of sleep and paradoxal phase by cycles and the variation of the number of completed cycles. The principal changes of sleep structure after intensive physical loads are expressed in increase of the length of the slow-wave phase through lengthening mainly of stage 4. After forced weight loss an increase of the length of the slow-wave phase also was observed, but through lengthening mainly of stage 2. This fact, in combination with the results obtained in the comparison of a number of other indicators, confirms the probability of the hypothesis of a connection of stage 4 of the slow-wave phase of sleep with processes in restoration of the energy resources of the organism.

USSR

UDC 612.76

PHYSIOLOGY OF MOVEMENTS

Leningrad FIZIOLOGIYA DVIZHENIY in Russian, Izd-vo Nauka 1976 375 pp

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P749 K
by A. Fel'dman]

Scientific Council for Complex Problems of the Physiology of Man and Animals,
Academy of Sciences USSR. Manual of Physiology

[Text] The biomechanics of the motor apparatus, neurophysiological principles of the control of movements and the particular physiology of movements are examined. The manual consists of the following 10 chapters (author's name in parentheses). Elements of the Biomechanics of the Human Body (Bogdanov). Mechanical Properties of Skeletal Muscles and Their Regulation by the Nervous System (Fel'dman). Motor Units and the Motoneuron Pool (Person). Muscular Spindles and the Regulation of Their Activity (Severin). Vestibular Control of Muscular Activity (Kislyakov). Stem Influences on Spinal Mechanisms of Control of Movements (Shapovalov). The Role of the Cerebellum in the Control of Movements (Arshavskiy). The Pyramidal System (Kostyuk). Control of the Ground Locomotion of Mammals (Shik). Biomechanics of the Locomotion of Man (Bogdanov and Gurfinkel'). References 1773.

USSR

UDC 612.76

BIOMECHANICS OF HUMAN LOCOMOTION

Leningrad FIZIOLOGIYA DVIZHENIY (Physiology of Movements. Collection) in Russian, Izdatel'stvo Nauka 1976 pp 276-315

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P791
by K. Ye. Popov]

BOGDANOV, V. A. and GURFINKEL', V. S.

[Text] The biomechanical characteristics of human walking and running are examined: the time structure of the step (the rate and the ratio of the length of the periods of the double and single support). The method of constructing equations of motion on the basis of the d'Alambert principle is explained. Methods of calculating the moments of force in the joints during walking are discussed. Data of electromyographic investigations of walking are presented which show the presence of both reciprocal and concomitant activation of antagonist muscles. The change of the mechanical energy during walking is described and estimates of the energetically optimal regime of walking are given. References 227.

USSR

UDC 612.76

ELEMENTS OF BIOMECHANICS OF THE HUMAN BODY

Leningrad FIZIOLOGIYA DVIZHENIY (Physiology of Movements. Collection) in Russian Izdatel'stvo Nauka 1976 pp 5-37

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P750 by M. I. Lipshits]

BOGDANOV, V. A.

[Text] Examined are the rheological properties of living tissues and their age changes; the properties of bones and the kinematics of their unions; the resulting forceful effect of muscles on the skeleton; the maximal force developed by muscles in static positions of the locomotor system and during movement. Presented as an example of the application of the fundamental principles of mechanics is an analysis of the system of forces acting on the body of man and on his foot in pushing away from a support. Examined are dynamic models of the body, their kinematic connections and degrees of freedom, the change of the mechanical energy of the body during movement and the energetic optimization of motor activity. It is shown how by means of equations of dynamics a connection is established between the kinematic and force characteristics of motion of the human organism. References 171.

USSR

UDC 612.76

THE ROLE OF THE CEREBELLUM IN CONTROLLING MOTION

Leningrad FIZIOLOGIYA DVIZHENIY (Physiology of Movements. Collection) in Russian, Izdatel'stvo Nauka 1976 pp 163-193

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P751 by Ye. Ya. Dumin]

ARSHAVSKIY, YU. I., Institute of Information Transmission Problems, Academy of Sciences USSR, Moscow

[Text] Survey. Examined are motor disorders arising after affection of the cerebellum and afferent and efferent connections of the cerebellum. After extirpation of the cerebellum only disorders of coordination arise. It is assumed that the cerebellum plays the role of a damping system which prevents the development of oscillations during the execution of movements; according to other hypotheses, the cerebellum is a comparator in the system of control of movements or serves for measurement of the time intervals between afferent signals. The cerebellum also plays an important role in the process of establishment of motor activity, that is, in the period of learning movements. References 136.

USSR

UDC 612.6

SCIENTIFIC CONFERENCE ON "METHODS OF INVESTIGATING FUNCTIONS OF THE ORGANISM IN ONTOGENESIS" MOSCOW 17-19 DECEMBER 1975

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 1 No 6, 1975
pp 1079-1082

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R55 by G.S.]

ZMANOVSKIY, YU. F.

[Text] Besides scientists of eight union republics, representatives of the Mongolian People's Republic participated in the conference. Forty-six reports were heard at two plenary and 4 sectional sessions. The main problems discussed at the conference were: methods of studying the nervous system in children; the development of movements in children and youth; methodical principles of the study of regional blood circulation in children (special attention was given to the impedance method of studying the regional blood flow and rheography); age characteristics of metabolism; age morphology and anthropology; methods of studying the working capacity of schoolchildren. There was emphasis of the need, in conducting all physiological investigations of biorhythms, to take into consideration corresponding processes and the everyday activity of the child, and his school activity in particular.

USSR

UDC 612.766.1 612.825.8

DEPENDENCE BETWEEN THE LABOR ACTIVITY OF PERSONS OVER 45 YEARS OF AGE AND THE STATE OF THE RESPIRATORY SYSTEM

Sofiya PROBL. V"TR. MED. (Problems of Internal Medicine) in Bulgarian
Vol 3 No 3, 1975 pp 119-128

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R506 Resume]

STOYNEV, G., GUNCHEVA, M., and VIZEV, S.

[Text] An investigation was conducted of 824 persons over 45 years of age. Their social class was determined mainly by their occupations--46% were engaged in agriculture and 29% were workers. The age at which they began to work was early--12 years on the average, and they had been working from 35 to 38 years. The degree of working activity was estimated on the basis of socio-logical, clinical and functional investigations. Persons without diseases of the respiratory and cardiovascular systems had the highest degree of working activity. In persons with such diseases, on the contrary, their length of service was very short. In groups of persons with pulmonary diseases, with compensated cardiac diseases and especially with diseases of both systems, the mean values of the indices of ventilation and the elasticity of the lungs were reduced, with compensatory increase of the frequency of respiration. The performance of work involving physical effort causes a well-expressed subjective feeling of dyspnea. References 15.

USSR

UDC 612.76

MECHANICAL PROPERTIES OF SKELETAL MUSCLE AND THEIR REGULATION BY THE NERVOUS SYSTEM

Leningrad FIZIOLOGIYA DVIZHENIY (Physiology of Movements. Collection) in Russian, Izdatel'stvo Nauka, 1976 pp 39-68

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P784 by Author]

FEL'DMAN, A. G., Institute of Information Transmission Problems, Academy of Sciences USSR, Moscow

[Text] The elementary principles of regulation of the posture, force and rigidity of muscles both with preserved innervation and deafferentated are described. The Merton hypothesis of control of the muscle length is examined. It is shown that equilibrium is established in the system muscle-load at the equilibrium point, that is, the point of intersection of two static characteristics: load-length and muscle force-length. The transition to a new muscle length is accomplished by shift of the equilibrium point. There are two methods of shifting--change of the load and change of the static characteristic of the muscle. With any shifting method movement to a new equilibrium point develops. The parameters of the activity of the motoneuron pool, the regulation of which makes it possible to shift the equilibrium point, are examined. The main one of them is the threshold of recruiting of motor units. The role of central activation of alpha- and gamma-motoneurons is examined in providing physiological ranges of regulation of length, force and rigidity of muscles. References 80.

USSR

UDC 612.766.1 612.825.8

INFLUENCE OF ACTIVE AND PASSIVE REST ON SOME INDICES OF HIGHER NERVOUS ACTIVITY OF SEWING MACHINE OPERATORS OF ASSEMBLY LINE TRICOT PRODUCTION

Kalin VOZRASNYYE OSOBNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motorvisceral Regulation During Various Types of Muscular Activity. Collection) in Russian No 3, 1975 pp 93-100

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R519 by Yu. A. Shulagin]

OSIPOVA, O. V.

[Text] The effectiveness of passive and active rest was determined in sewing machine operators in the course of an 8-hour working day in a sewing shop. The dynamics of the latent period of simple and complex visuomotor and audiomotor reactions and labor productivity were studied by "photography of the working day" with consideration of the speed of the working operation and density of loading of working time. It is shown that at an identical density of loading of the working day the latent period of sensorimotor reactions was reduced in both the first (42.74%) and second (42.76%) halves of the shift under the influence of active rest. References 4.

USSR

UDC 612.76

ELECTROPHYSIOLOGICAL CORRELATES OF THE ORGANIZATION OF TWO-COMPONENT ARBITRARY MOVEMENTS OF MAN

Leningrad MATERIALY SIMPOZIUMA "MEKHANIZMY ORGANIZATSII DVIZHENIY"
(Materials of the Symposium on "Mechanisms of Organization of Movements")
in Russian 1976 pp 84-88

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P790
by A. Fel'dman]

ZALKIND, M. S., and KOZ'MYAN, E. I., Institute of Information Transmission Problems, Academy of Sciences USSR, Moscow

[Text] A comparison was made of changes of the indicators of function of different levels of motor control (spinal N-reflex, EMG and somatosensory evoked response in the EEG) during the completion of a simple arbitrary movement--plantar flexion--or two plantar flexions combined into a single motor act. The tested person began the plantar flexion at a light signal. At the end of the signal (after 700 msec) the tested person must have completed the movement (first series) or completed the additional solar flexion (second series). In the third series the signals for the movement were given in pairs and it was necessary to respond to each by a single plantar flexion. It was shown that complication of the programing before the first of the separate movements has no effect on segmentary excitability, although it leads to weakening of the early changes of the evoked somatosensory response. Evidently the processes of movement programing are considerably separated from the mechanisms of direct accomplishment of the movement.

USSR

UDC 612.6

BIOLOGICAL PREREQUISITES FOR INCREASE OF THE LENGTH OF LIFE

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975. Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 7-19

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R92
by Author]

FROL'KIS, V. V., Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Text] Analysis of interspecies length of life in various animals indicates the possible prospect of increasing the length of life by 25-40%. An increase in the species length of life of man is assumed in the course of historical development. Proofs of the importance of two opposite tendencies

for evolution are presented: the rapid change of generations and increase of the length of life in definite species of animals. On the basis of the adaptation-regulation theory of aging an analysis is made of the forming adaptative mechanisms, the activation of which creates the prerequisites for increase of the length of life. There are discussions of existing and possible ways to increase the length of life, ways connected with influence on the program of development which prevent and restore disorders of the genetic apparatus. The "by-pass principle" is substantiated in effects on the aging organism, connected with the use of undamaged adaptative mechanisms. It is assumed that "mild" inhibitors of protein biosynthesis, influencing genetic activity, increase the length of life by delaying the realization of the program of development. References 25.

USSR

UDC 612.766.1 612.825.8

DEPENDENCE OF SOME PHYSIOLOGICAL FUNCTIONS OF THE ORGANISM IN ASSEMBLY LINE WORKERS ON THE CONDITIONS OF WORK AND REST

Kalinin VOZRASNYYE OSOBNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motor-visceral Regulation During Various Types of Muscular Activity. Collection) in Russian No 3, 1975 pp 105-107

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R518 by Yu. A. Shulagin]

RATSENBERG, B. M.

[Text] Twenty-seven assembly line workers aged 19-24 years were systematically investigated 4 times per shift for 3 days. It was noted before the start of a shift the muscular tension of the right hand was 62.5 ± 2.1 g, the pulse frequency was 83.1 ± 2.1 beats per minute, the muscular strength was 23.2 ± 2.1 seconds (determined at an intensification of 75% of the maximum) and the latent period of visuomotor reactions was 0.23 ± 0.013 second. Immediately after work those values were 65.21 ± 1.8 g, 75.4 ± 1.7 beats per minute, 18.6 ± 2.3 seconds and 0.312 ± 0.013 second respectively. It was noted that the correlation coefficient between the muscular tension and volume of blood flow in the right hand was 0.61 before and 0.37 after work. The author assumes that increase of the conveyer speed in the course of the working day and also the introduction on production gymnastics compensates the deficit of proprioceptive pulsation, which by means of motorvisceral reflexes stimulates the working capacity of workers. References 3.

USSR

UDC 612.014.482.5 613.693

CHARACTERIZATION OF THE CARDIOVASCULAR SYSTEM IN DIFFERENT ANTIORTHOSTATIC POSTURES

Kalinin VOZRASNYYE OSOBENNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motor-visceral Regulation During Various Types of Muscular Activity. Collection) in Russian, No 3, 1975 pp 67-76

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R547 by Yu. A. Shulagin]

PETROV, B. V.

[Text] The author studied the character of vegetative-posture reactions during brief stay in various antiorthostatic positions (-4° ; -8° , -12° and -16°) and postures No 1 (with straightened legs) and No 2 (with elevated legs, bent at the knees). The investigation was conducted on 16 sportsmen with official ratings aged 27 to 33 years. It is shown that the pulse rate had a tendency to slow down in postures Nos 1 and 2 in antiorthostatic positions and also that in posture No 2 the pulse rate is slower than in posture No 1. The author distinguished three types of individual reactions of the pulse rate in postures Nos 1 and 2 to change of the angle of inclination. 1. Direct connection--the pulse rate increased with increase of the angle of inclination. 2. Reverse connection--increase of the angle of inclination led to slowing down of the pulse rate. 3. Differently directed connection--with increase of the angle of inclination the pulse rate increased in posture No 1 and decreased in posture No 2. References 7.

Public Health

USSR

UDC 612.6

DIET, HEALTH AND BIOLOGICAL AGE

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual. 1975 Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 80-87

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R81 by Author]

GRIGOROV, YU. G., Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Text] It is shown that when the calorie content of the diet is high (3100 calories or more) the investigated indices of health (cardiac function, EKG, BKG, body mass, lipid metabolism, the coagulating system of the blood, etc) were less favorable than when the calorie content was rational (2100-2650 calories) or low. A practically analogous correlative dependence was also determined in a comparison of the health indices with the amount of fat in the diet. The same dependence was traced in a general clinical evaluation of health and separate elements of the form of life. No substantial divergences were found between the biological and calendar age of people with a rational and a somewhat reduced calorie content in the diet. References 17.

USSR

UDC 612.6

CLINICAL AND STATISTICAL ASPECTS OF DIFFERENCE IN THE LENGTH OF LIFE OF MEN AND WOMEN

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual. 1975 Biological Possibilities of Increasing the Length of Life) in Russian 1976 pp 45-55

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R84 by Author]

CHEBOTAREV, D. F., Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Text] A statistical characterization is given of the difference of demographic shifts as a function of sex and age, based on a survey of large groups of people of senior age groups. A differential analysis was made of the data on the morbidity of people of both sexes, its dynamics in middle and old age, and also in the extremely aged. On the basis of statistical data and also a widely conducted clinical examination of the state of various systems of the organism of that age a greater physiological resistance of the female organism was established, one which gradually is leveled with approach of the eighth decade. By the same age period the difference in frequency of many diseases is to a considerable degree eliminated. In the work much attention was given to differences in the development and course of atherosclerosis and its complications in men and women. References 15.

USSR/BULGARIA

UDC 612.019 591.5 591.1

THE PROBLEM OF ADAPTATION AND THE HEALTH OF MAN (METHODOLOGICAL AND SOCIAL ASPECTS)

Moscow PROBLEMA ADAPTATSII I ZDOROV'YE CHELOVEKA (METODOLOGICHESKIYE I SOTSIAL'NYYE ASPEKTY) in Russian, Izdatel'stvo Meditsina 1976, 184 pp with illustrations

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R45 K Annotation]

DICHEV, T. G. and TARASOV, K. YE.

[Text] The monograph was prepared by the Bulgarian scientist T. G. Davich and the Soviet philosopher K. Ye. Tarasov. In it, on the basis of a large amount of factual and theoretical material, are presented the most urgent methodological aspects of biological adaptation, its complex dialectical essence, and its place and importance for understanding other properties of life and the evolution of the living. Revealed are the complex social system of adaptation of man, the social determinateness of his vascular biological adaptation and their connection with the problem of health and disease of man. Various fallacies of the conception of the social deadadaptation of man are subjected to critical analysis. The principal differences in adaptation and the state of health of the working people under socialism and capitalism are shown. Especially noted is the growing theoretical and practical importance of the problem of the adaptation of man for contemporary medicine and biology. The book is intended for physicians and biologists interested in philosophical problems of contemporary medicine and biology, and also for instructors of social hygiene and Marxist-Leninist philosophy in medical institutes.

Radiobiology

USSR

UDC 612.6

INFLUENCE OF IONIZING RADIATION ON THE LENGTH OF LIFE OF BIOLOGICAL OBJECTS

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975 Biological Possibilities of Increasing the Length of Life) in Russian, 1976 pp 96-103

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R95
by Authors]

ALEKSANDROV, S. N. and GALKOVSKAYA, K. F., Central Scientific Research Institute of Roentgenography and Radiography, Leningrad

[Text] Shortening of the length of life of irradiated biological objects is an integral result of remote radiation pathology which forms as residual effects of radiation disease, or radiation reactions of the organism, remote consequences of radiative effect (pathogenetically a special class of alterations) and results of their interference. Increase of the length of life caused by radiative effect (characterized by a relatively small dose and intensity of radiation) is observed in cases where the radiation mobilizes the potential reserves of the organism and does not hinder their optimal utilization. In that case the length of life of irradiated biological objects can prove to be greater than in control individuals existing under conditions in which their reserve possibilities remain partially unrealized, as, for example, in laboratory animals existing under the conditions of standard vivarium maintenance.

Therapy

USSR

UDC 612.13 616.12.092

TRACE ELEMENTS AND CARDIOVASCULAR DISEASES

Riga FIZIOLOGICHESKAYA ROL' I PRAKТИЧЕСКОYE PRIMENENIYE MIKROELEMENTOV
[The Physiological Role and Practical Application of Trace Elements.
Collection] in Russian, Izd-vo Zinatne 1976 pp 226-236

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 N160
Resume]

NOZDRYUKHINA, L. R., Central Clinical Hospital, Academy of Sciences USSR,
Moscow

[Text] A reduction of the levels of nickel, copper, chromium, strontium and vanadium was found in the blood of 612 patients with atherosclerosis and myocardial infarction. Regularly expressed changes of the trace elements of the blood composition indicate a need for corrective therapy of metabolism of trace elements in the presence of cardiovascular disease. Ways to study atherosclerosis with consideration of change of trace elements in the biosphere and human organism in different geographic zones are designated. References 55.

USSR

UDC 612.17 616.12.092

RECOGNITION OF CARDIAC DISEASES (DIFFICULTIES OF SPECIFIC AND DIFFERENTIAL DIAGNOSIS)

Tashkent RASPOZNAVANIYE BOLEZNEY SERDTSA (TRUDNOSTI CHASTNOGO I DIFFERENTSIAL'NOGO DIAGNOZA) in Russian, Izd-vo Meditsina 1976, 276 pp with illustrations

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 N295K
Annotation]

SUMAROKOV, A. V., MOISEYEV, V. S., MIKHAYLOV, A. A., and KASYMOV, I. YU.

[Text] Some difficulties in the diagnosis of ischemic cardiac disease, rheumatism, chronic septic endocarditis and vitia cordis, and also difficulties in recognition of cardiac insufficiency are examined. Mainly atypical, difficultly-diagnosed variants of the course of the principal cardiac diseases, some little-known nosological forms and distinctive features of their treatment are analyzed. The account is based on examples reflecting the clinical experience of the authors. The book is intended for therapists and various specialist physicians. References 232. Index.

BEHAVIORAL SCIENCES

Child Psychology

USSR

UDC 612.833.81 591.51

ADAPTATIONAL POSSIBILITIES OF THE CHILD'S ORGANISM TO ACTIVITY UNDER
CONDITIONS OF SUDDEN CHANGE OF THE SITUATION

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1,
1976 pp 121-126

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P553
by Author]

LYAKH, V. I., Institute of the Physiology of Children and Youth, Academy of
Pedagogical Sciences USSR, Moscow

[Text] The adaptational possibilities of boys 8-9 and 11-12 years of age toward activity were studied under the conditions of sudden change of the situation as a function of the state of development of their psychophysiological functions distinguished in a characterization of the given activity. The change of the role of various psychophysiological functions was distinguished in the structure of the given activity in those age periods, which are connected with heterochronic maturing and the development of those functions. It was established that the age period of 11-12 years is a more sensitive and receptive period for the development of adaptational possibilities toward activity under conditions of a sudden change of the situation than the period from 8 to 9 years. References 17.

Educational Psychology

USSR

UDC 612.833.81 591.51

COGNITIVE ACTIVITY AS A FACTOR OF LEARNING MOTIVATION

Kiev PSYKHOLOGIYA (Psychology. Republican Scientific Methodical Collection)
in Ukrainian No 15, 1976 pp 46-54

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P621
Resume]

GORBACH, M. S., Cherkassy Medical Institute, Cherkassy

[Text] The results of investigation of cognitive activity as a component part of learning motivation are presented. The task was set of substantiating the criteria of cognitive activity and establishing the parameters. The connection between the levels of claims in the presence of different, psychologically opposite motivation was studied. There are grounds for considering that the correlation coefficient between the levels of claims in the presence of different motivation is an essential, independent indicator of the level of development of cognitive activity. References 2.

Engineering Psychology and Ergonomics

USSR

UDC 612.014.482.5 613.693

SIMULATION OF FACTORS OF SPACE FLIGHT AFFECTING THE RELIABILITY OF THE SYSTEM MAN-MACHINE

Moscow-Leningrad O MODELIROVANIYA FAKTOROV KOSMICHESKOGO POLETA, VLIYAYUSH-CHIKH NA NADEZHnost' SISTEMY "CHELOVEK-MASHINA" [Preprint of Report of the Academy of Sciences USSR. Scientific Council for the Complex Problem "Cybernetics." Scientific Council for Problems of Control of Motion and Navigation. Scientific Council for Complex Problems of the Physiology of Man and Animals. Interdepartmental Scientific and Technical Council for Problems of Reliability of the Gosstandart USSR. Leningrad Territorial Group of the National Committee for Automated Control] in Russian 1975, 20 pp with illustrations

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R588 by Yu. A. Shulagin]

[Text] Three main stages in the ergonomic provision of planning of the system man-machine are pointed out. Synthesis of the purpose of the planned system man-machine and the tasks which it is to perform in the process of operation, and also the properties necessary for it to satisfy its purpose. Determination of the rational degree of automation of control and servicing. On the basis of the results of the distribution of functions the activity of each specialist forming a part of the system man-machine is planned.

General Psychology

USSR

UDC 612.821 159.9

PSYCHOLOGICAL PROBLEMS OF THE SOCIAL REGULATION OF BEHAVIOR

Moscow PSIKHOLOGICHESKIYE PROBLEMY SOTSIAL'NOY REGULYATSII POVEDENIYA
in Russian, Izd-vo Nauka 1976, 368 pp

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P525 K
by Authors]

SHOROKHOVA, YE. V., and BOBNEVA, M. I.

[Text] Various factors controlling human behavior: legal and moral norms, systems of values, needs, the social situation, etc. are analyzed. Also examined are general methodological questions of the social determination of behavior of the personality in different groups and collectives, psychological mechanism of the effect of social norms and the interaction of people in various social groups.

USSR

UDC 612.6

LENGTH OF LIFE OF REPRESENTATIVES OF VARIOUS OCCUPATIONS

Kiev GERONTOLOGIYA I GERIATRIYA (Gerontology and Geriatrics. Annual 1975 Biological Possibilities of Increasing the Length of Life) in Russian, 1976 pp 204-211

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R85 by
Authors]

STEZHENSKAYA, YE. I. and MASLOVSKAYA, N. I., Institute of Gerontology,
Academy of Medical Sciences USSR, Kiev

[Text] Data are presented on the different length of life and distinctive features of the mortality rate of representatives of different occupations. Occupational groups were distinguished with relatively low and relatively high mortality levels, which indicates an important role of favorable and unfavorable factors determined by occupation or occupational activity. Noted is the influence of working conditions and occupational injuries, and also such socio-economic and socio-hygienic factors, determined by the occupation, as manner of life, diet and cultural level. However, making a correct evaluation of the connection of length of life and occupation is prevented by a number of general socially stipulated factors (occupational selection, the novelty of occupations, etc). References 21.

USSR

UDC 612.833.81 591.51

THE ROLE OF THE TIME FACTOR IN EMOTIONAL ACTIVITY

Kiev PSYKHOLOGIYA (Psychology. Republican Scientific Methodological Collection) in Ukrainian No 15, 1976 pp 11-13

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P629
Resume]

YEL'KIN, D. G., Odessa State University, Odessa

[Text] The task was set of clarifying the influence of the time factor on emotional activity. In a number of experiments it was successfully shown that a state of confusion which affects the productivity of actions of a tested person arises after a certain time interval in control experiments after a corresponding situation has been brought about in fixating experiments. The situation was developed by complicating the set task in the course of a definite time interval.

USSR

UDC 612.833.81 591.51

METHODOLOGICAL ANALYSIS OF THE SOCIO-PSYCHOLOGICAL ESSENCE OF SUGGESTION

Kiev PSYKHOLOGIYA (Psychology. Republican Scientific Methodical Collection) in Ukrainian No 15, 1976 pp 3-10

[From REFERATIVNYY ZHURNAL, BIOLOGIYA NO 11 (3) 1976 Abstract No 11 P615
Resume]

TATENKO, V. O., Scientific Research Institute of Psychology, Ukrainian SSR, Kiev

[Text] The work represents an attempt to use some principles of dialectics for a methodological analysis of the essence of suggestion as a socio-psychological mechanism of socialization of the individual. In particular, following the Leninist principle of the way to penetrate the essence by dividing the single into opposites and reducing them to identity, the relation of suggestion and conviction is regarded as internal contradiction. This permits, somewhat differently from B. F. Porshnev, formulating a principle of the tendency of the development of suggestion in the history of society and substantiating the urgency of the problem of analysis of suggestion by levels in the ontogenesis of the interaction of the child and the adult. References 12.

USSR

UDC 612.833.81 591.51

PERSONAL EXPECTATIONS AS A FORM OF MANIFESTATION OF CONSCIOUSNESS OF SELF

Kiev PSYKHOLOGIYA (Psychology. Republican Scientific Methodological Collection) in Ukrainian No 15, 1976 pp 108-116

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P653
Resume]

TISHCHENKO, S. P., Scientific Research Institute of Psychology Ukrainian SSR, Kiev

[Text] A classification of personal expectations is given. Situative and deferred or dispositional expectations are distinguished as a function of the time factor, conditional as a function of the conditions limiting the degree of probability of expectations; two types with directivity toward oneself and others are distinguished as a function of the object toward which expectations are directed; positive and negative as a function of the emotional tone (coloration) of expectations and, finally, partial as a function of the limitedness of the sphere of action. In addition, on the basis of study of individual features of expectations (the degree of their adequacy for the group, the tone, sphere and objects toward which expectations are directed) in juveniles four groups of expectations are distinguished: confident-optimistic, partial confident-optimistic, illusory-optimistic and anxious-pessimistic. References 9.

Physiological Psychology

USSR

UDC 612.833.81 591.51

BIOLOGICAL PREREQUISITES FOR THE ESTABLISHMENT OF FORMS OF ACTIVE REFLECTION

Kiev FILOSOFSKIYE VOPROSY MEDITSINY I BIOLOGII (Philosophical Questions of Medicine and Biology. Republican Interdepartmental Collection) in Russian No 8, 1976 pp 25-33

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P427
Resume]

MOROZOV, M. N., Donetsk Medical Institute

[Text] The origin of specifically human forms of vital activity--creative activity and labor activity is explained on the basis of both the social and the natural scientific approaches. The author concludes that the transition from a biological to a social form of reflection was caused, on the one hand, by a radical transformation of the content of the behavior of higher organisms, gradually becoming subjective activity and, on the other hand, qualitative changes of the structure of reflection connected with the formation of a system of social motivations, aspirations and volitions, value relations toward an object, the appearance of self-consciousness and aware knowledge. Used as a methodological approach is the idea of self-development of matter and the dialectical materialistic principle of causality, which, in particular, permit treating the general biological phenomenon of activity as a natural prerequisite for establishment of the creative activity of creating and transforming the practical activity of man. References 10.

USSR

UDC 612.833.81 591.51

PHARMACOLOGICAL ANALYSIS OF MEMORY MECHANISMS

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY (Memory in Mechanisms of Normal and Pathological Reactions. Collection) in Russian, Izd-vo Meditsina 1976 pp 122-158, 365-371

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P468
by V. I. Kaplan]

KRAUZ, V. A.

[Text] A summary of experimental work of the author on the influence of pharmacological preparations on the short-term memory (method of postponed reactions) and long-term memory (conditioned-reflex method), and also on the functional organization of the brain (method of long-term implantation of electrodes in a number of structures of the subcortex and cortex) on the

background of the effect of delays which were applied in the first part of the work. A detailed analysis is presented of the author's own and the literature data.

USSR

UDC 612.833.81 591.51

STUDY OF CYTOCHEMICAL MECHANISMS OF INFORMATION RECORDING IN THE NERVOUS SYSTEM

Pushchino I-YE PUSHCHINSKIYE CHTENIYA PO PROBLEMAM PAMYATI (First Pushchino Lectures on Problems of Memory. Summaries of Reports) in Russian 1976 pp 14-17

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P430 by R. A. Chizhenkova]

ROZANOV, S. I., Institute of Biophysics, Academy of Sciences USSR, Pushchino-na-Oke

[Text] Each behavioral act forms as a result of the interaction of a large number of processes occurring on all levels of reception, from the reception of signals to the activity of effector systems observed in behavioral experiments. Purposeful study of molecular mechanisms cannot be based on indirect correlates of given biochemical effects on the brain of an animal with the characteristics of its study. The tasks of study of the molecular mechanisms of information recording in the nervous system proved to be relatively narrow, as they are concentrated on the investigation of the cytological and cytochemical mechanisms of change of the synaptic conductivity under the influence of excitation. The hypothesis of the dynamic adaptation of the neuron is advanced. The basis for it is the concept of the system of equilibrium biochemical reactions which assure conductivity of the synapse. Plasticity of the synapse is explained in that case by shifts in the system of reactions connected with the synthesis of receptor protein and its incorporation in the chemoceptive membrane.

USSR

UDC 612.833.81 591.51

THE MECHANISM OF LONG-TERM MEMORY

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY
(Memory in Mechanisms of Normal and Pathological Reactions. Collection)
in Russian Izd-vo Meditsina 1976 pp 40-66, 349-355

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P474
by R. D.]

GRECHIN, V. B.

[Text] Survey. A number of hypotheses and experimental directions in the investigation of mechanisms of the process of consolidation and preservation of information in the brain are examined, including the molecular (the role of RNA, DNA, protein and "transport" of memory), and also experimental data of the author in studying physiological mechanisms of the psychic activity and memory of man. Data obtained in investigating the influence of the single administration (parenteral) of antibiotics (actinomycin D and chloramphenicol) on subcortical links of mnemonic activity make it possible to assume that in man the consolidation of verbal traces with the drawing in of the genetic apparatus of the brain cells already starts in the first minutes of information preservation.

USSR

UDC 612.821 159.9

PATHOLOGICAL CONDITIONED REFLEXES AND THE ROLE OF MEMORY IN THEIR ORGANIZATION

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY
(Memory in Mechanisms of Normal and Pathological Reactions. Collection) in
Russian, Izd-vo Meditsina 1976 pp 269-280, 386

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P539
by A. N. Chepkova]

KHANANASHVILI, M. M.

[Text] Theoretical premises and some of the possible approaches in the investigation of the role of memory in the formation of pathological conditioned reflexes are discussed. Cases of pathology of higher nervous activity are examined which can be caused by the fixation in the memory of disorders arising in the course and regulation of other mechanisms of conditioned reflex formation ("information neuroses") and cases presumably caused by disruption of the proper mechanisms of memory (conditions of intraspecific deprivation). The distinguishing of these two approaches appears to be promising for the analysis of phenomena and the selection of the optimal way to treat pathology.

USSR

UDC 612.833.81 591.51

INFLUENCE OF EXTERNAL NOISES ON THE VISUAL PERCEPTION OF FORM

Kiev PSYKHOLOGIYA (Psychology. Republican Scientific Methodical Collection) in Ukrainian No 15, 1976 pp 13-17

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P562
Resume]

TIMOSHENKO, R. O., Odessa State University, Odessa

[Text] Investigation experimentally solves the question of the influence on the visual perception of form of external noises, heterogeneous (acoustic and acoustic-vibrational) and homogeneous (visual). Investigation has shown that under conditions of external noise the adequacy of perception decreases in an overwhelming majority of cases. Visual external noise has the strongest disturbing influence. In a series with visual external noise a very large number of those tested reduce the rate of perception, a very small quantity shows resistance to noise and a certain number of those tested cannot perform a task at all under the conditions of the influence of external noise. Heterogeneous external noises are less disturbing. In a series of experiments with acoustic external noise the percentage of those tested who reduced their rate of perception was somewhat lower than in the others, and the noise resistance was considerably higher. Vibrational external noise, acting together with acoustic, exerts a greater disturbing influence than acoustic alone. References 2.

USSR

UDC 612.833.81 591.51

POSSIBILITIES OF DISTINGUISHING THE PHASE OF SHORT-TERM MEMORY CONNECTION WITH REVERBERATION OF EXCITATIONS ON THE BASIS OF AN INDICATOR OF THE FUNCTIONAL STATE OF NEURAL STRUCTURES

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1, 1976 pp 91-99

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P567
by Authors]

LIKALOVA, N. P., and CHUPRIKOVA, N. I., Institute of General and Pedagogical Psychology, Academy of Pedagogical Sciences, Moscow

[Text] Experimentally determined was the presence of local gradually damped traces of point visual stimuli, manifested in a state of increased excitability of their projections. The length and expressiveness of the traces

increase with increase of the degree of analysis of the stimuli, but under all conditions their length does not exceed several tens of seconds. The opinion is expressed that a local trace found on the basis of an indicator of the functional state of neural structures corresponds to the concept of damping reverberation of excitations and constitutes a substratum of one of the phases of short-term memory. References 19.

USSR

UDC 612.833.81 591.51

PHYSIOLOGY OF SPEECH. PERCEPTION OF SPEECH BY MAN

Leningrad FIZIOLOGIYA RECHI. VOSPRIYATIYE RECHI CHELOVEKOM in Russian,
Izd-vo Nauka, 1976, 388 pp with illustrations

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P598 K
by Authors]

CHISTOVICH, L. A., VENTSOV, A. V., GRANSTREM, M. P., ZHUKOV, S. Ya.,
ZHUKOVA, M. G., KARNITSKAYA, E. G., KOZHEVNIKOV, V. A., LISENKO, D. M.,
LYUBLINSKAYA, V. V., MUSHNIKOV, V. N., SLEPOKUROVA, N. A., FEDOROVA, N. A.,
KHAABEL', R. Kh., CHISTOVICH, I. A., and SHUPLYAKOV, V. S.

[Text] The book is devoted to an examination of the processes in the processing of a speech signal by the auditory system and brain of man. In section I the properties of a speech signal are described and problems in understanding the meaning of an oral communication are discussed. In section II data and theoretical concepts are presented regarding segmentation of the speech flow and the phonemic classification of the sounds of speech and the perception of the rhythmic and melodic signs of speech sequences. In section III the results of investigations and of modeling peripheral auditory analysis are described and the latest physiological and psychoacoustic data on the processing of a signal in the auditory system are discussed.
References 551.

USSR

UDC 612.76

THE ROLE OF MOTOR-VISCERAL REGULATION IN THE PHYSIOLOGY OF EMOTIONS

Kalinin VOZRASNYYE OSOBENNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motor-Visceral Regulation in Different Types of Muscular Activity. Collection) in Russian No 3, 1976 pp 5-14

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P767 by K. Ye. Popov]

GUBMAN, L. B. and MOGENDOVICH, M. R.

[Text] The motor analyzer participates in the regulation of vegetative reactions. As a result of interaction of the cortex and subcortical structures the vegetative effects are intensified. On the level of the hypothalamus, to which the leading role in the formation of emotions is attributed, the reactivity of the sympathetic and motor systems varies in parallel. The state of the subcortical centers, including the nucleus of the hypothalamus, in the opinion of the authors, is regulated by the cortical motor analyzer. The correlation of motor and vegetative reactions can be different, depending on the situation and type of human nervous system. References 19.

USSR

UDC 612.833.81 591.51

ANALYSIS OF NEURODYNAMIC EQUIVALENTS OF THE NEURAL CODE OF VERBAL SIGNALS

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY (Memory in Mechanisms of Normal and Pathological Reactions. Collection) in Russian Izd-vo Meditsina, 1976 pp 28-40, 348-349

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P602 by Yu. I. Kuz'min]

GOGOLITSYN, Yu. L., Institute of Experimental Medicine, Leningrad

[Text] Electrophysiological methods of investigating the principles of coding word semantics in the human nervous system are examined. The results are given of analysis of the activity of neuron populations of patients with parkinsonism during their perception and repetition of Russian and foreign words. Expressed activity was detected in some sections of the globus pallidus. Comparison of the frequency of the registered discharges has shown that the activity of the registered neuron ensemble varies during the perception of different words. Changes of the character of the activity in time also are observed. Differences have been discovered in activity during recall of foreign words, the meaning of which was mastered previously by those tested, in contrast with unknown words. The results show that the investigated structures participate in the process of perception and remembrance of verbal stimuli. The character of the neuron activity depends partially on the acoustic characteristics of the stimuli and partially on the process of its semantic analysis.

USSR

UDC 612.833.81 591.51

INTERVERBAL NEURAL CONNECTIONS OF THE SECOND SIGNAL SYSTEM

Moscow FIZIOLOGIYA CHELOVEKA (Human Physiology) in Russian Vol 2 No 1, 1976
pp 59-70

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P607
Resume]

USHAKOVA, T. N., Institute of Higher Nervous Activity and Neurophysiology,
Academy of Sciences USSR, Moscow

[Text] One of the mechanisms of the second signal system, interverbal neural connections, is examined. By interverbal neural connections is understood the physiological mechanism which on the basis of verbal signals imprinted in the human brain assures their interconnection. It is known that phenomena of the "subjective connection" of words (verbal associations) have been widely studied in psychology. A survey is given of the experimental data available in the literature and the concepts relating to mechanisms of verbal connections, and the nature and functions of those connections are discussed. The concept of "semantic generalization" is analyzed. The question of the neurophysiological substrate of the semantic content of a word is examined. The concept of the difference of mechanisms of connection between semantic cognate words and homophones is argued. References 41.

USSR

UDC 612.833.81 591.51

NEUROPSYCHOLOGY OF MNESTIC FUNCTIONS AND DEEP STRUCTURES OF THE HUMAN BRAIN

Leningrad PAMYAT' V MEKHANIZMAKH NORMAL'NYKH I PATOLOGICHESKIKH REAKTSIY
(Memory in the Mechanisms of Normal and Pathological Reactions) in Russian
Izd-vo Meditsina 1976 pp 292-323, 390-396

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 P669
by N. V. Arsenina]

SMIRNOV, V. M. and SHANDURINA, A. N.

[Text] In patients with hyperkineses and phantom disease syndrome, memory was investigated by the method of implanted electrodes in different stages of their treatment. The results of examination of patients with a double test (1969) indicate a substantial reduction of the possibilities of short-term memory in them, especially when additional operations of material processing have been introduced, a preferential worsening of the rapid memory and also considerable instability of mnemonic processes. No convincing proofs were obtained for the value of the sign of dominance of the hemispheres on the subcortical level to assure function of the short-term memory,

although there are data indicating asymmetry between the hemispheres: the thresholds of change of the short-term memory during electrical stimulation of formations of the left hemisphere are distinctly higher than that of structures of the right hemisphere. Electrical stimulation of a large portion of the investigated parts of the brain (within the pulvinar, globus pallidus and mesencephalic sections of the truncus) is accompanied by noticeable improvement of the short-term memory.

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THE EMOTIONAL FACTOR IN THE LABOR ACTIVITY OF WEAVERS

Kalinin VOZRASNYYE OSOBENNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motor-visceral Regulation During Various Types of Muscular Activity. Collection) in Russian No 3, 1975 pp 79-86

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R517 by Yu. A. Shulagin]

PODBEREZIN, I. M.

[Text] It has been found that most workers have a calm and cheerful attitude in the first half of a shift and by the end of the work it is replaced by irritation and depression. Interrogation of weavers showed that their attitude depends on the state of the industrial equipment in 78% of the cases, on unfavorable working conditions (noise and high atmospheric humidity and air temperature) in 48%, on the state of affairs in the family in 31%, on the state of the organism (fatigue and the general state of health) in 27% and on mutual relations with comrades in the production group and with the administration in 14% of the cases. The retransmitting of music in an experimental section of weaving production to weaken the harmful effect of noise on the workers partially reduced fatigue, increased working capacity and formed a positive emotional attitude in the workers.

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GALVANIC SKIN REFLEX AS AN INDICATOR OF THE PSYCHOPHYSIOLOGICAL STATE IN
THE PROCESS OF ASSEMBLY LINE WORK

Kalinin VOZRASNYYE OSOBNOSTI MOTORNO-VISTSERAL'NOY REGULYATSII PRI
RAZLICHNYKH VIDAKH MYSHECHNOY AKTIVNOSTI (Age Characteristics of Motor-
visceral Regulation During Various Types of Muscular Activity. Collection)
in Russian No 3, 1975 pp 101-104

[From REFERATIVNYY ZHURNAL, BIOLOGIYA No 11 (3) 1976 Abstract No 11 R515
by Yu. A. Shulagin]

MOGENDOVICH, M. R., and RATSENBERG, B. M.

[Text] The emotional component of a worker's attitude was determined indirectly by means of the galvanic skin reflex (GSR) and the pulse rate, obtained on a synchronous recording before the start and at once after the end of a work shift in 15 workers on an assembly line with a constant compulsory working rhythm (first conveyer) and 15 workers on a second assembly line with a free working rhythm. By the end of a shift an increase of the amplitude of the GSR, its length and latent period, accompanied by a slowing down of the pulse rate, was noted in workers on the first assembly line. In workers on the second assembly line shortening of the latent period of the GSR and of its length and increase of the pulse rate and amplitude of the GSR were observed at the end of the shift. The author proposes characterizing as a manifestation of fatigue the observed lack of coordination between the pulse rate and the value of the GSR at the end of the working day in workers of the first assembly line. References 7.

CSO: 1840

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